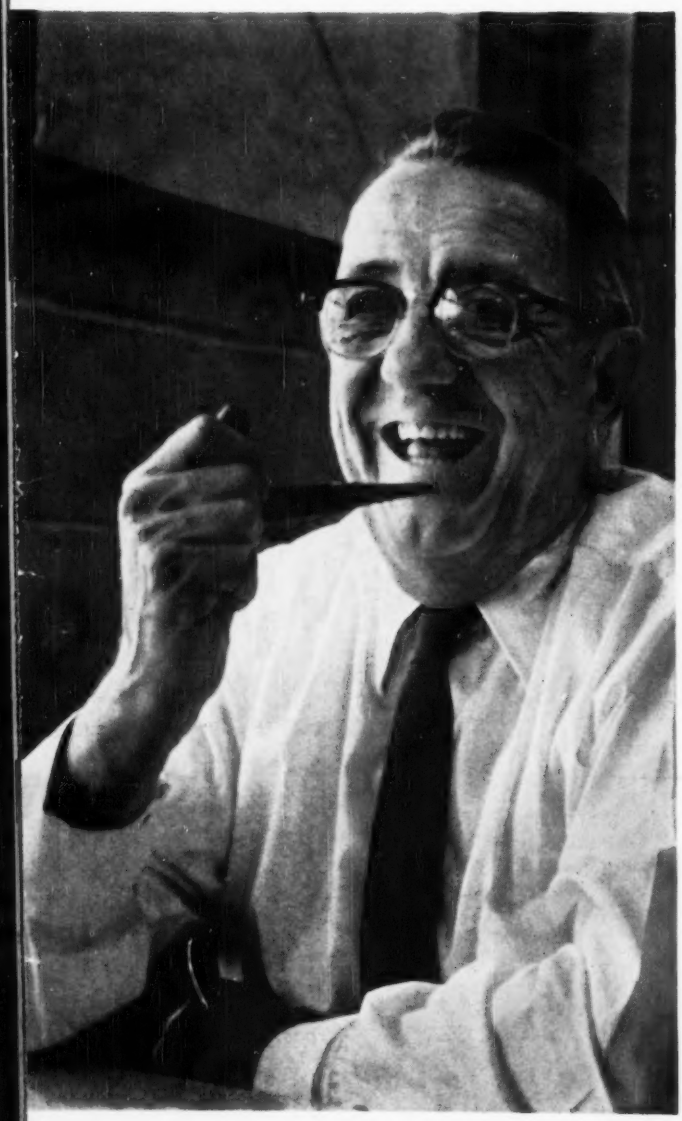
Chemical Week



APRIL 30, 1960 Price 50 cents

First-quarter sales are up; profit picture is dappled with dips . . . . . p. 21

Want a college-fresh sales trainee? You'll pay $500/month. . . . . p. 45

Frozen-food transport with no moving parts. Key: liquid nitrogen . . . p. 61

Computerized pilot plant costs more but gets data faster . . . . . p. 69

Dow's Oren: Motives move men . . . p. 96

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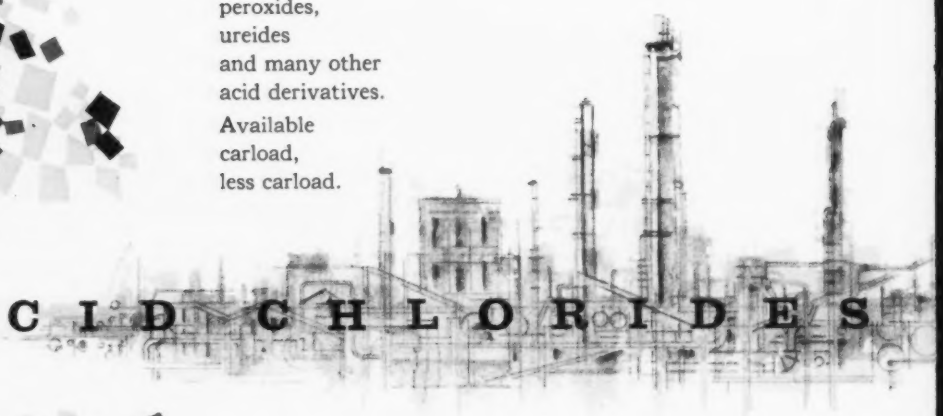

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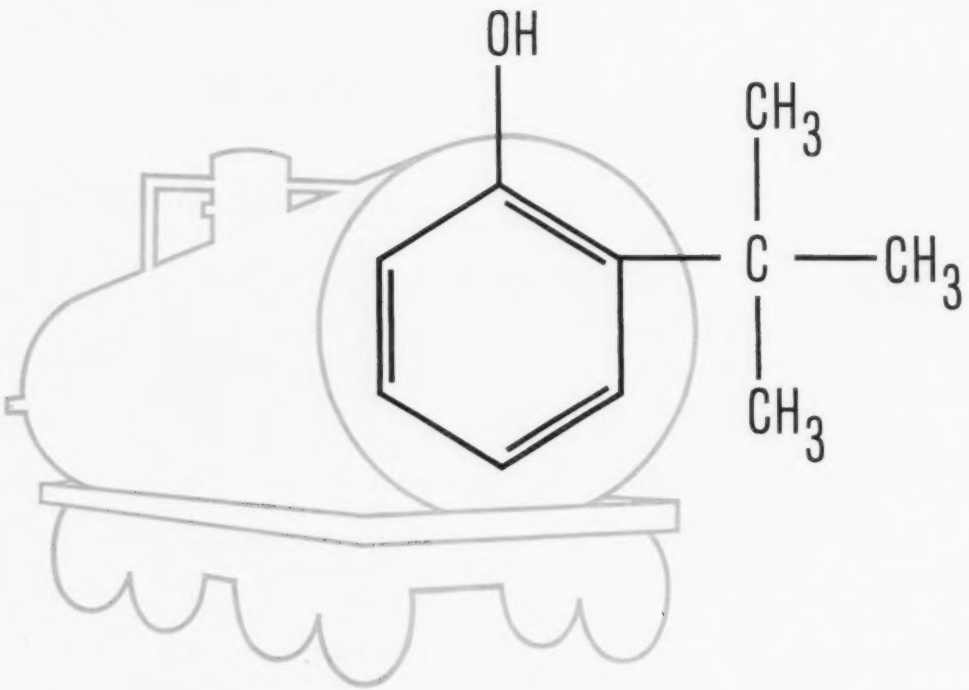

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Chemical Week

TOP OF THE WEEK

April 30, 1960

- **New life on the Big Sandy:** story behind petrochemical growth at tri-state junction of Ohio and Big Sandy rivers....**p. 81**
- **'Rare' metals groom for space-age role:** the unfolding markets for beryllium, tantalum, columbium .....**p. 92**
- **Scientific management—yes; but worker motivation** is also vital element of effective maintenance .....**p. 96**

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21 Mixed operating results for this year's first quarter: chemical sales make solid gains over '59's first and fourth periods, but some profits are sagging.

22 Capital spending is in for a big jump this year; outlays will top those of any previous year except '57. CPI managers made their budget-boosting decisions within the past few months.

24 Is Olin Mathieson out of the woods at last? President Osborn feels the 33% rise in first-quarter profits shows company is now on sound financial footing.

24 In U.S. chemical exports, the big swing last year was to busy, prosperous West Europe.

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62 Small chemical companies can go after overseas business, says specialties-man Max Potash. Here's his idea of how to do it.

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72 General Electric readies ion-membrane fuel cells for debut in portable military power supplies.

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81 ADMINISTRATION
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82 Congress' windup dash before Presidential nominating conventions may leave chemical legislation hanging.

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96 PRODUCTION
Recent gains in maintenance efficiency resulted from scientific management methods. But don't overlook worker motivation. Interview with veteran maintenance manager.

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No. 18

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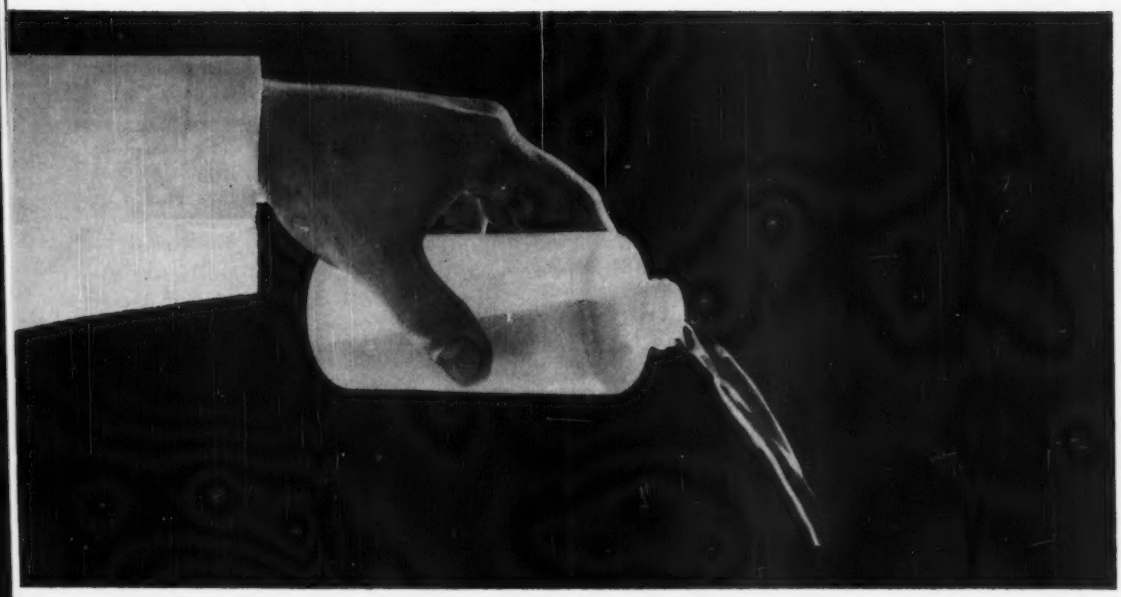

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VIEWPOINT

Get Them Off the Fence

THE COMING PRESIDENTIAL CAMPAIGN will be the most emotionally charged in recent history. The issues of religion, old-age benefits and civil rights are already in the limelight—and will stay there. In such an atmosphere it's easy to lose sight of some important issues that may bulk larger in determining the future of the U.S. than do the more sensational ones.

What is the position of each candidate on issues affecting the business community? Business has a big job to do in providing livelihood for most of us—and it is certainly entitled to ask what kind of climate it can expect. During the past seven years the climate has been kept largely clement—despite the grumbles of those who see something immoral in making a profit and exercising the prerogatives of ownership. The distorted picture of the drug industry presented by investigating committees, the unreasoned approach to food additive legislation, the unsupportable charges brought against chemical firms by antitrust and other agencies are examples of ill-conceived incursions by government into the area of business. Since government is so much with us, it's only proper that both the Presidential and Congressional candidates tell us where they stand on issues affecting business.

What, for instance, does Kennedy see as the proper role of governmental regulatory bodies? What is Nixon's view on tariffs? What does Humphrey think of the concept of regulated profits? What about Lyndon Johnson's views on depletion allowances?

We can find some of the answers by looking at the voting records. But suppose we end up with Rockefeller and/or Stevenson—how do we judge them? And to those who see the election as a shoo-in for Nixon, there's no assurance that he'll follow Eisenhower's lead. Will he veer to the left or to the right of our present path?

No economic sector as competitive as the $80-billion/year chemical process industries is going to be unanimous in pushing for the same objectives; but all segments should know their friends and foes.

The machinery of determining the chemical industry consensus about important issues is already set up. The Manufacturing Chemists' Assn. and the Synthetic Organic Chemical Manufacturing Assn., among others, express industry's viewpoint to our legislators.

There's great merit in speaking with one voice in matters that affect our whole industry, but there's always the danger of being scorned as a pressure group. Let's ask our questions of this year's candidates not simply as businessmen but also as citizens. The two are not incompatible: our Constitution, in fact, was in large measure put into force by men who valued property rights as well as by social ameliorists. A simple letter to the candidates asking them where they stand may well elicit a better response and do more good than a high-powered industry effort to make a candidate aware of its problems.

Government has been asking the questions of industry and getting straight answers. What we need now is reciprocity. Let's find out from the candidates where they stand on issues we deem important.

LETTERS

Rug-Pulling Prelude?

TO THE EDITOR: Your "Viewpoint" (*March 5*) gave some interesting comments on reasons for Russia's purchase of our chemicals.

I can't remember where, but I recently read of another possibility that may be more to the point than any of those you mentioned.

This was the statement that one of Russia's methods of weakening capitalism is to become a substantial customer for its goods and then "pull the rug" by suddenly cutting off purchases.

J. C. MADIGAN
Naugatuck Chemical
Naugatuck, Conn.

Aerosol Perfumes

TO THE EDITOR: I found your article titled "Aerosols: Fragrance Front-Runners" (*Jan. 2*) most interesting and informative, and I congratulate you for a most timely report.

On the other hand, I feel that you should set the record straight on some vital facts. For example, you state that "in '58, Chanel broke the ice for the 'French' houses," etc. . . . Previous to this you state that in '54, "Carven-Parfums (New York) brought out aerosol cologne versions of Ma Griffe and Robe D'Un Soir." As a perfumer, I can tell you that Carven is considered no less "French" than Chanel or Lanvin, and in all three cases their aerosol versions have been packaged in the United States.

Furthermore, I believe you made a serious oversight in omitting Corday completely from your history of aerosols. In Jan '54, Carven introduced its aerosol colognes; and in March '54, Corday (which is also a "French house") brought out its aerosol colognes (one month before American house Lentheric, which you did mention). Corday has been extremely successful in its aerosol program, having sold well over a million units of its spray colognes alone.

What is more, Corday pioneered aerosol perfume use, winning the official packaging award of the Chemical Specialties Manufacturers Assn. in '54 for its purse perfume aerosol atomizer.

In addition, Corday worked closely with a valve manufacturer (VCA), and together we produced the first

metered-spray valve, which we used in our aerosol perfume package.

We agree that consumer acceptance of aerosol colognes and perfumes seem to indicate a very bright future for this form of packaging in our industry. However, I would seriously question the figure in your article, which cites as a fact "that 77% of all fragrances sold are now packaged in aerosols." I cannot believe this is true, especially in view of the lower-priced fragrance items sold in tremendous quantity in nonaerosol bottles. . . .

HERBERT F. STORFER
Executive Vice-President
Corday Inc.
New York

Corday has been an aerosol pioneer, and this fact should have been noted Nevertheless, Chanel "broke the ice" in the sense that, because of its great size, its competitors were forced to follow suit.

The 77% figure is admittedly an estimate, but one that was not gainsaid by the many perfumers we talked with.—ED.

Mexican Sulfur

TO THE EDITOR: Your story regarding sulfur in Tehuantepec (*March 19, p. 25*) mentions sulfur explorations companies prospecting on a large concession, but no mention is made that the second-largest sulfur company in the area is Texas International Sulphur (Houston).

This company is operating on a 6-million-ton proved dome and has produced about 20,000 tons to date. There are 27 wells on a 24-hour production basis, producing 400 tons/day. The firm is negotiating to buy from the Mexican government the defunct Mexican Gulf Sulphur Co. and has unexplored concessions embracing over 100,000 acres. . . .

ALFRED J. PEIFFER
West Palm Beach, Fla.

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: H. C. E. Johnson, Chemical Week, 330 W. 42nd St., New York 36, N.Y.

Ink for Automation

TO THE EDITOR: May I compliment you and your staff on the very interesting article on magnetic check printing (*CW, March 12, p. 95*).

After an extended period of research and development, we are now one of the major suppliers of this type of ink; as such, we are keenly aware of the difficulties you must have had in gathering the available data and in presenting to the public the correct present status. This is a new development, and, although it has already found several major applications, it seems destined to assume a major role in many phases of automation.

Especially pleased were we all that once again printing inks have "made" the cover of a major chemical magazine. This doesn't happen too often, you know. Furthermore, it is surely significant that the occasion to bring printing inks to national attention was not in the time-honored field of publication printing nor in the more recent and glamorous field of packaging, but in . . . this still newer and very promising field of control and automation, where precision is of utmost importance.

CARL B. BLAKE
Director of Research
Sinclair and Valentine Co.
New York

Free Trade or Not?

TO THE EDITOR: When I started to read your editorial "Time To Argue Free Trade" (*Feb. 13, p. 13*), my first impression was that you were being a bit facetious. After all, there has been an almost continuous clamor made about imports in the past, with insistence on high tariffs and import quotas by certain segments of the chemical industry.

However, the views given in your editorial and those of the purchasing agents discussed in the article "Pros and Cons of Foreign Buying" (*p. 95*) reflect a more realistic attitude toward international trade by the chemical industry. This broader attitude on the part of the industry, its spokesmen and its media can result only in the sound development of production facilities and world markets.

Incidentally, that discussion by some astute purchasing agents would also make a good case study for those of us who are selling overseas markets.

MICHAEL A. BERNARDI
Wantagh, N.Y.

CHEMICAL WEEK *is neither "protectionist" nor "free-trade." Either stand is unrealistic because it is too general. Selectivity—deciding each case on the basis of the best interests, not solely of the producers, but of the national economy and defense—strikes us as the proper approach.*—ED.

Liquid, Not Gas

TO THE EDITOR: In your article "Tank Truck Bids for Chlorine Traffic" (*CW, March 19, p. 31*), your statement that "chlorine is carried as a gas in 1-ton cylinders, not as a liquid as in other tank cars" is in error. The chlorine in ton containers is in the liquid form, same as it is in all chlorine cylinders (50-, 100-, 150-lb. sizes) and all tank cars. . . .

H. A. SOMMERS
Pennsalt Chemicals Corp.
Philadelphia

Right. It can be bled off as a gas, but it is in the liquid phase inside the cylinder.—ED.

MEETINGS

Chamber of Commerce of the United States, 48th annual meeting, Washington, D. C., May 1-4.

Electrochemical Society, spring meeting, La Salle Hotel, Chicago, May 1-5.

Industrial Waste Conference, Purdue University, Lafayette, Ind., May 3-13.

Mechanical Handling Exposition, Earls Court, London, England, May 3-13.

American Institute of Chemists, annual meeting, Radisson Hotel, Minneapolis, May 11-13.

Chemical Market Research Assn., meeting; theme construction needs plastics may fill; Biltmore Hotel, New York, May 18.

Operations Research Society of America, annual meeting, Statler Hotel, New York, May 19-21.

Technical Assn. of the Pulp & Paper Industry, coating conference, Edgewater Beach Hotel, Chicago, May 23-25.

The Materials Handling Institute, New England show, Commonwealth Armory, Boston, June 6-8.

Synthetic Organic Chemical Manufacturers Assn., meeting, Roosevelt Hotel, New York, June 14.

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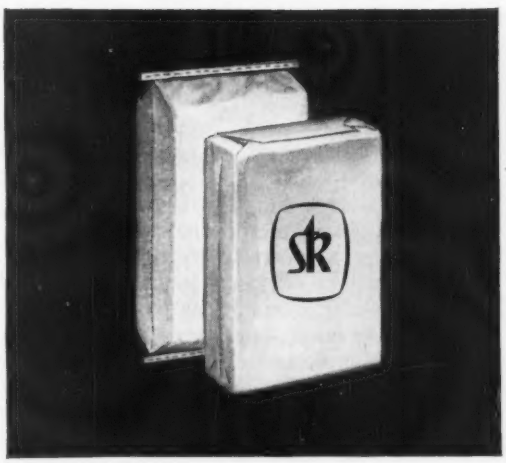

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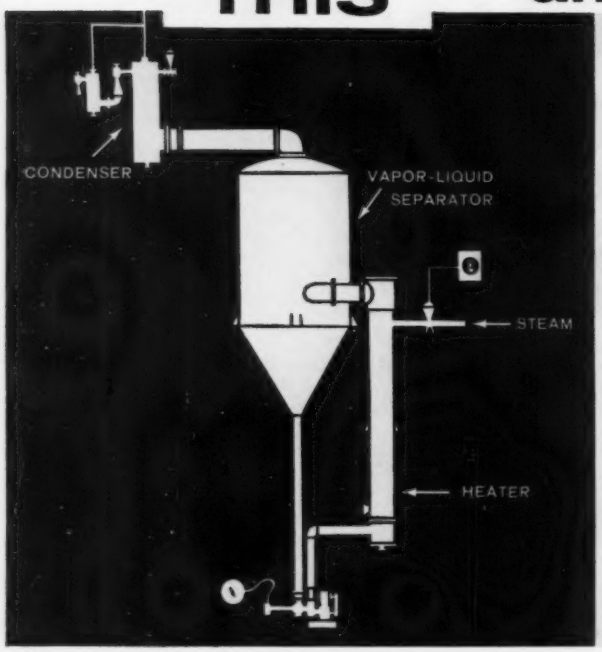

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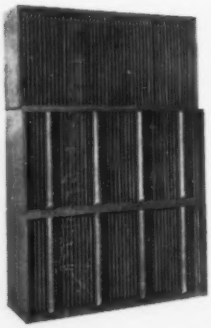

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THE BUSINESS MAGAZINE OF THE CHEMICAL PROCESS INDUSTRIES

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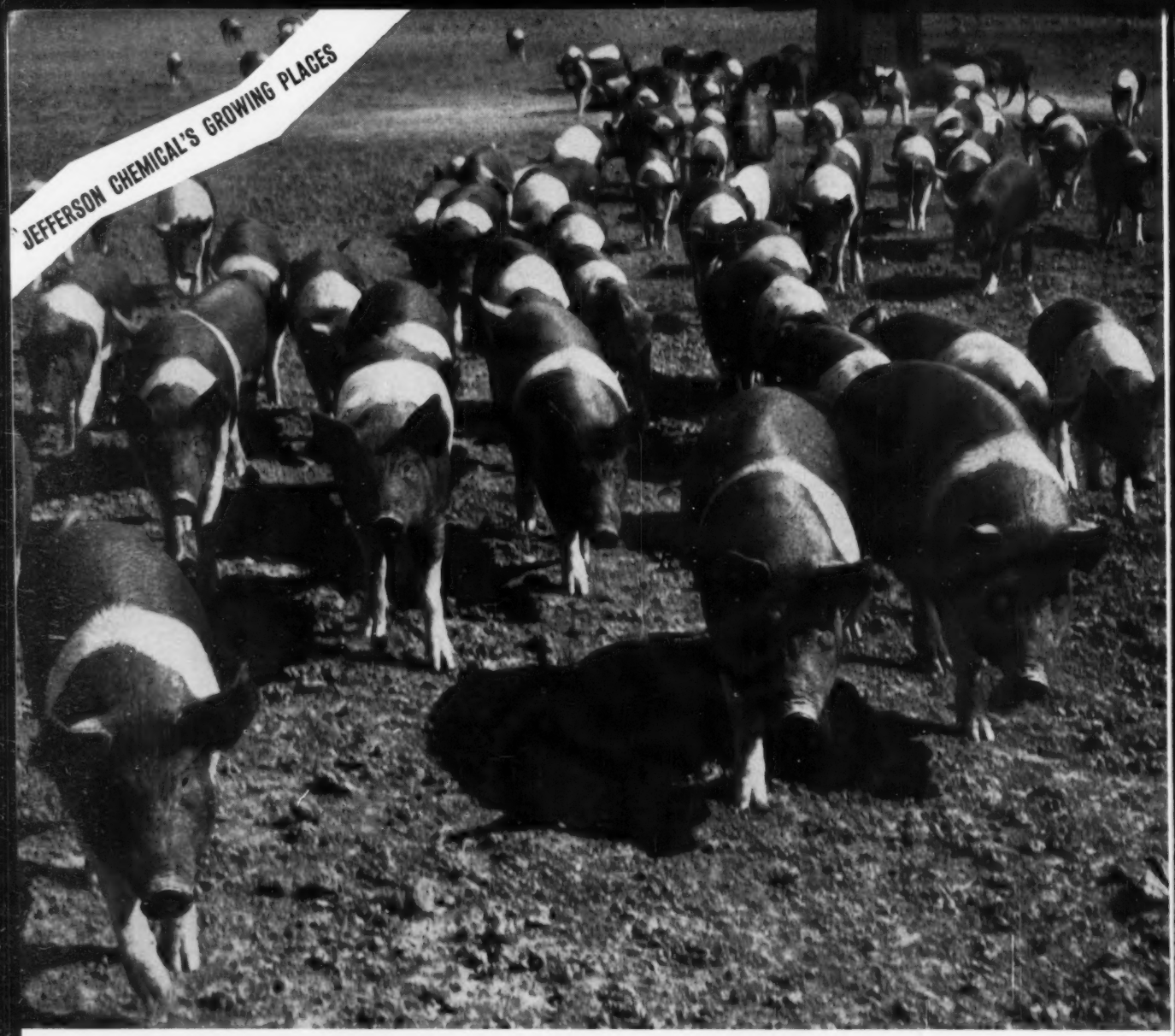

Making pigs healthy is also Jefferson's business

Thousands of progressive hog raisers consider piperazine to be superior to all other anthelmintics as a safe, sure, and economical method of swine worm control. Keeping pigs healthy and producing maximum gains is particularly important to the grower during this year of depressed pork prices. Jefferson, as the leading producer of piperazine, has done much to keep the supply adequate and the price low . . . piperazine costs 75% less than antibiotic-type wormers per hog treated.

Jefferson also produces such piperazine derivatives as N,N′-Dimethylpiperazine, which shows promise as a catalyst for flexible urethane foams; N-Aminoethylpiperazine, a new curing agent for epoxy resins; and Piperazinedipropanol, being tested as a catalyst for rigid urethane foams. In addition, Jefferson supplies complex polyamine mixtures containing piperazine compounds. These mixtures are useful intermediates in the asphalt, resin and petroleum industries. For information on Jefferson's complete line of chemicals and services . . . contact Jefferson Chemical Company, Inc., 1121 Walker Avenue, P. O. Box 303, Houston 1, Texas.

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JEFFERSON CHEMICALS

Business
Newsletter

CHEMICAL WEEK
April 30, 1960

This week it's official: Rohm & Haas' $6.1-million bid for the Louisville, Ky., butadiene plant has been accepted by the government. R&H now will move to transform the wartime facility into an acrylic products plant. The company says that recent reports that it will spend $10 million to get the plant into production just aren't true—that the exact outlay has not yet been determined. (Total capital expenditures planned by Rohm & Haas for '60 are expected to be about $34 million compared with $19 million in '59.)

The butadiene plant, which has been in the custody of Publicker Industries since '55 (*CW Business Newsletter, Feb. 20*), "has good offices, power plant and warehouse facilities, but little equipment which R & H can utilize for its products," according to Rohm & Haas officials. Therefore new construction will be required for this fifth R&H plant.

Although the company plans to produce both acrylic monomer and polymers at the plant, it still hasn't determined whether acrylic molding powders will be made at this facility. Earliest production target: midsummer 1961.

•

And Reichhold Chemicals has officially acquired Modiglass Fibers, Inc., a Florham Park, N.J., glass fiber products manufacturer held by Nicolet Industries, also of Florham Park (*CW Business Newsletter, April 16*). The two companies report that RCI now has acquired a controlling stock interest for an undisclosed number of RCI shares.

•

Two firms project future expansions at annual meetings:

• Sun Oil President Robert G. Dunlop said the company is planning further expansion in petrochemicals—either on its own, or in affiliation with other companies (along the lines of its partnerships with Olin Mathieson and American Viscose). But the lines it will take reportedly are "somewhat undecided."

• Susquehanna Corp.'s J. Patrick Lannan, chairman and president, predicts further expansions and acquisitions as the firm diversifies—especially into electronics and metallurgy. Already under way: the construction of a new uranium processing plant near Falls City, Tex., and a new vanadium processing plant at Edgemont, S. D.

•

Expansions are coming in petrochemicals and silicones:

• Cities Service Co. is beginning immediate construction of a multimillion-dollar, 120-million-lbs./year ortho-xylene plant at its subsidiary's (Cities Service Refining Corp.) Lake Charles, La., refinery. The company says a contract with Cosden Petroleum has been entered into

for sale of the plant's production through Cosden's agent, Fallek Chemical (New York).

• General Electric, as first step of a two-year silicone expansion program, will construct a $1-million fluids finishing building at its Waterford, N.Y., facilities.

• Olin Mathieson will build a multimillion-dollar plant near its inorganic chemicals works at Saltville, Va., to produce anhydrous hydrazine for the government. This apparently will be for the conjectured switch to a mixture of hydrazine, unsymmetrical dimethylhydrazine and nitrogen tetroxide as fuel for the Titan ICBMs (*CW, Feb. 27, p. 23*).

• Solar Nitrogen Chemicals—owned 50-50 by Atlas Powder and Standard Oil of Ohio—will build a $15-million ammonia and urea plant near Joplin, Mo. Natural gas will be purchased as principal raw material. It's expected that some of the output will go to Atlas' plant at Webb City, Mo., for ammonium nitrate and nitric acid.

•

A new crackdown on chemicals residues in foods might turn out to be a boon to both the chemical and food-producing industries. The Food & Drug Administration (1) is starting to make seizures for DDT-contaminated milk; (2) is about to propose a regulation requiring drug manufacturers to prove the safety of their antibiotic products sold for injection in dairy cows. This intensified vigilance might help convince Congress that FDA and industry can be trusted with a less-restrictive color additives law than the Delaney-type version now being considered, which contains an all-out prohibition on use of any additive regarded as a possible cause of cancer.

•

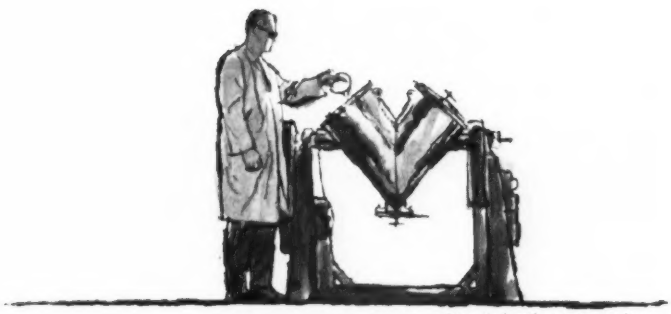
The proposed Industrial Rayon-Texas Butadiene merger may not come off this week as scheduled (*CW, April 16, p. 24*). Two groups of IRC minority stockholders are trying to block the move—one group via a lawsuit, the other in a bid for proxies. These dissidents says they think the proposed stock exchange ratio—1.43 shares of IRC common for 1 share of TB&C common—doesn't reflect the relative book value of the securities.

•

Latest company financial reports confirm the mixed trends in chemical sales and earnings (*p. 21*). But one company that's optimistic for the year as a whole is Allied Chemical. Executive Committee Chairman Harry Ferguson told stockholders this week that current projections indicate a possible 10% rise in sales to a 12-month total in the neighborhood of $800 million. If this sales total is attained, he added, earnings could rise from last year's $2.50/share to $3 "or better." He said substantial sales gains by Allied's international division are reflecting increased volume on newer products, and that several new overseas ventures are expected to be announced later this year.

P-K Pre-test Laboratory **reveals obsolescence in solids processing**

Multi-step operations telescope into a single step at the P-K Solids Processing Pre-test Laboratory. This is a lab away from home, a yardstick that predicts savings in materials, labor and investment. » » » The P-K Pre-test Laboratory features the new P-K Solids Processor*. This latest "twin shell" development blends liquids and solids, granulates, vacuum dries, coats, reacts chemicals, sterilizes – performs as many as eleven operations – in simple sequence.



*patented and patents pending

The P-K Pre-test Laboratory is unmatched anywhere. It demonstrates things impossible to see without pilot study, works out subtle variables in blending, granulating and drying, provides scale-up data and operational procedures. We invite you to take full advantage of its facilities—either by bringing or sending your materials to East Stroudsburg. » » » You'll work with well-qualified engineers who have made thousands of resultful pre-tests for processors. They often suggest and produce unexpected product variations. Your guidance will be helpful. » » » Due to heavy lab schedule, we suggest you write or call George Sweitzer today at Stroudsburg. To call direct dial 717 – Hamilton 1-7500. He will supply you with all the pertinent information regarding dates, amount of material required, shipping and travel information.

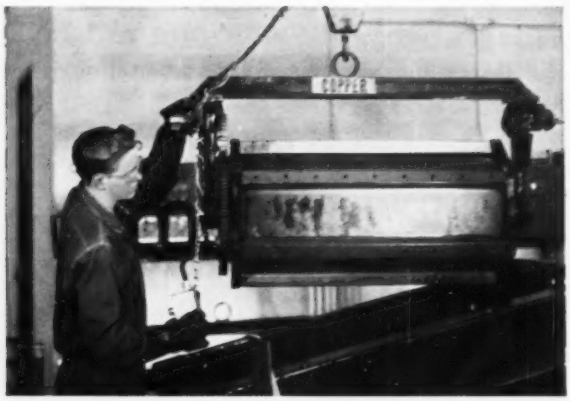
patterson-kelley
Chemical and Process Equipment Division
116 Burson Street, East Stroudsburg, Pa.

SURE WAY TO KEEP A STEP AHEAD in the shoe sole business is by using PLIOFLEX. Its light color, assured ease of processing, high uniformity and excellent physical properties permit top quality at low cost.

HARNESSING THE HORSEPOWER of aircraft engines often is the job of tiny "O"-rings of CHEMIGUM, with its excellent resistance to heat, cold and hydraulic fluids, good physical properties and easy processing.

Progress Report on Chemigum,

RIGHT DOWN THE ALLEY are bowling balls with outer shells of PLIOFLEX. It provides greater toughness, a better finish, and extreme uniformity at lower cost because of its uniformity and assured processability.



ANSWER TO A BARREL OF PROBLEMS was the use of CHEMIGUM in hard-rubber electroplating cylinders. Reasons: High strength plus resistance to high temperatures, chemicals and solvents that added up to a useful life three times longer than the material previously used.

Few, if any, companies can match the experience of Goodyear in the manufacture of synthetic rubber and related products.

As early as the 1920's, our researchers obtained patents from which today's manufacture of synthetic rubber has been derived. In 1939, CHEMIGUM became the first nitrile rubber to be commercially produced in this country. And this type of leadership has continued down through the years.

Where do we stand today? Here are a few highlights on the products of our Rubber & Rubber Chemicals Department:

1. **PLIOFLEX**—our styrene/butadiene or general-purpose rubbers—the most widely used synthetic rubbers in the world today and the only ones that provide Assured Processability.

2. **CHEMIGUM**—our oil-resistant rubbers—still first and finest of the nitrile rubbers—choice of many quality manufacturers for exacting jobs.

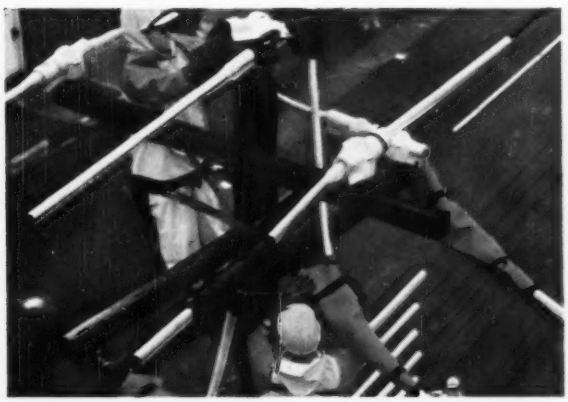
3. **PLIOLITE S-6**—our high styrene, rubber reinforcing resins—

GOOD

RUBBER THAT KEEPS ITS AGE A SECRET . . . happy result of the development of WING-STAY 100—first truly effective combination of antioxidant and antiozonant and now available in PLIOFLEX "C" rubbers.

INFLATABLE PRODUCTS AT DEFLATED PRICES but of excellent quality are made with covers of PLIOLITE S-6B and PLIOFLEX. Light color, leather-like properties with excellent resistance to abrasion and moisture are the reasons for their use.

Plioflex *(and related products)*



"FOUL" WEATHER FRIENDS are the linemen's suits pictured above. They're made invitingly warm and comfortable with a coating based on PLIOFLEX and carefully protected with WING-STAY T for long-term softness, flexibility and light color.

BUILT TO TAKE A BEATING is the handsome car floor cover you're looking at here. It's made of PLIOFLEX to assure clean, crisp colors and excellent durability at low cost. Its high uniformity and easy processing help make this possible.

have no peer in processability or in the way they impart leather-like properties to all kinds of rubber.

4. WING-STAY T—our nonstaining antioxidant—is the outstanding protector of light-colored rubber products against age, sunlight and discoloration.

5. WING-STAY 100—our staining antioxidant—is unmatched in its trend-setting, triple-threat performance as a stabilizer, antioxidant and antiozonant in transportation rubber products.

What's the reason for this progress? It's the man in all these man-made products. Our research, development and production people, our sales-service men and our sales representatives have outdone themselves to create and supply the finest available line of raw materials for the rubber industry. Testifying to their achievement are the products shown here which come from a few of the hundreds of reputable manufacturers we are proud to list as our customers.

If you would like further information on any of the products of our Rubber & Rubber Chemicals Department, feel free to write to Goodyear, Chemical Division, Dept. P-9417, Akron 16, Ohio.

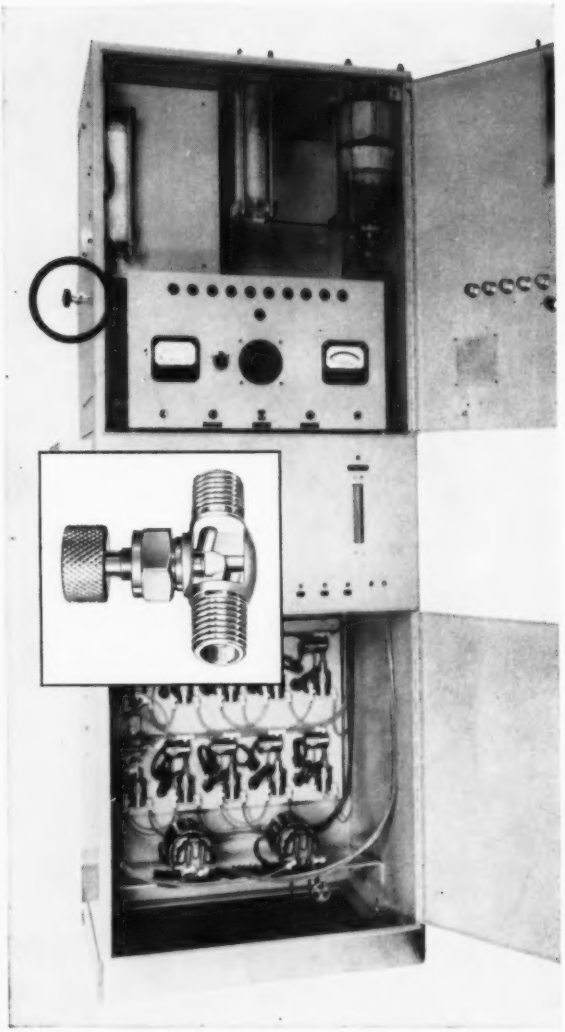
YEAR CHEMICAL DIVISION

Chemigum, Plioflex, Pliolite, Wing-Stay—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

3M COMPANY CHEMICALS

THE RAW MATERIALS OF PROGRESS

KEL-F® BRAND PLASTIC ... maximum performance in corrosive media analyzer



Needle valves for systems in which highly corrosive gases or liquids flow are manufactured by Hoke, Incorporated, Cresskill, N. J. Limitations on materials for tips and linings for these valves are severe. They must be chemically inert, allow no leakage, not damage valve seats, perform in a wide temperature range and have long life. After exhaustive tests, Hoke engineers found the one material that meets or exceeds all of their specifications . . . KEL-F Brand Plastic.

This tough, resilient plastic has exceptionally high tensile and compression strength. KEL-F Plastic can be readily molded by injection, extrusion, compression or transfer methods to produce parts with a high degree of precision. Valve tips are molded for Hoke by Garlock Packing Corporation.

One of the toughest applications for the Hoke valves has been in a series of gas analyzers manufactured by Davis Instruments, Newark, N. J. These analyzers subject KEL-F Plastic to such corrosive substances as ammonia, hydrogen sulfide, hydrocarbon streams, nitrous fumes, hydrogen bromide and ethyl chloride.

For full performance details of KEL-F Brand Halofluorocarbon Polymers, write today to: 3M Chemical Division, Dept. KAK-40, St. Paul 6, Minnesota.

"KEL-F" is a Reg. T. M. of 3M Co.

Another outstanding KEL-F BRAND PLASTIC application:

KEL-F Plastic Bobbins in rockets, missiles, satellites

Bobbins of KEL-F Plastic in miniature relays are meeting the stringent requirements of electronic systems for air-space use.

Why KEL-F Plastic? Because it performs notably in a 710 degree temperature range, from −320°F. to 390°F. Because it has high impact and compression strength, excellent dimensional stability, zero moisture absorption and high dielectric strength.

With such characteristics KEL-F Plastic is an ideal material for aircraft and missile use!

CHEMICAL DIVISION

MINNESOTA MINING AND MANUFACTURING COMPANY

. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

THE TIN CANS THAT TURNED INTO GOLD

(Another Diamond Alkali Success Story about Caustic Soda)

A Scrap Dealer was having trouble deciding whether or not to go into the steel detinning business. He wasn't even sure a practical reclaiming method had been perfected.

He called the Diamond technical man and gave him the problem. The problem was referred to the Diamond laboratories.

Not only was this man given a formula for detinning with caustic soda, but also a detailed flow chart of the process and tips on how best to market the reclaimed tin.

If *you* use caustic soda, get to know the Diamond technical man. He saves customers money on shipping and handling problems, helps with their process problems. What he can't handle himself, he'll refer to the Diamond Research Center.

There is no finer caustic soda than Diamond's. There is no better service than Diamond's. No matter where your plant is located, you can get fast, economical delivery from one of Diamond's four strategically located producing plants. By truckloads, carloads or bargeloads.

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HANDLING C_4 HYDROCARBONS

Having higher vapor-pressure, Petro-Tex C_4 Hydrocarbons require somewhat different handling and unloading facilities and techniques than heavier olefins. Our new manual, "Handling C_4 Hydrocarbons", provides prospective users a background for understanding these differences and the voluminous codes and regulations on the safe handling of flammable hydrocarbons in pressure-type containers.

Included are shipping data on all Petro-Tex chemicals as well as handling and storage techniques and general information regarding the unloading of cylinders, tank trucks, tank cars and barges. Fire and explosion precautions and a bibliography of references to safety codes and governmental regulations (keyed to the text) complete this useful manual.

We will be pleased to send a copy to those whose work may lead to broader use of Petro-Tex chemicals. We also invite inquiries on

BUTADIENE **ISOBUTYLENE** **DIISOBUTYLENE**
TRIISOBUTYLENE **n-BUTENE-1** **n-BUTENE-2**

Petro-Tex®

PETRO-TEX CHEMICAL CORPORATION

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fmc JOINTLY OWNED BY FOOD MACHINERY AND CHEMICAL CORPORATION TENNESSEE GAS TRANSMISSION COMPANY

Chemical Week — April 30, 1960

Sales Soar—Profits Falter

Consensus of industry leaders is that business through the rest of '60 will be good—but not necessarily as good as in the first quarter.

In the three-month period just completed, nearly all chemical companies had good sales volume; many companies set new records for first-quarter sales. And on the whole, profits were up, compared with either the preceding quarter or the corresponding period of one year ago.

But the over-all increase in profits by no means measures up to the average rise in sales; and numerous chemical companies are reporting either token increases or actual decreases in earnings, compared with those in first-quarter '59.

One possible slowdown in the economy may be in the textile industry. It's noted that three leading producers of synthetic and man-made fibers—American Enka, Chemstrand, Industrial Rayon—all report first-quarter drops in both sales and earnings. Two other big fiber producers that are larger and more diversified—Du Pont and Celanese—report gains in sales but approximately 2% dips in earnings.

Numerous chemical executives testify that their companies' earnings are being squeezed between increasing operating costs—e.g., rising costs of purchased materials, labor, and research and development programs—and chemical product prices that have been either static or declining.

Pharmaceutical sales and earnings were up, but sales of fertilizers and agricultural chemicals were delayed by heavy snows in the Midwest.

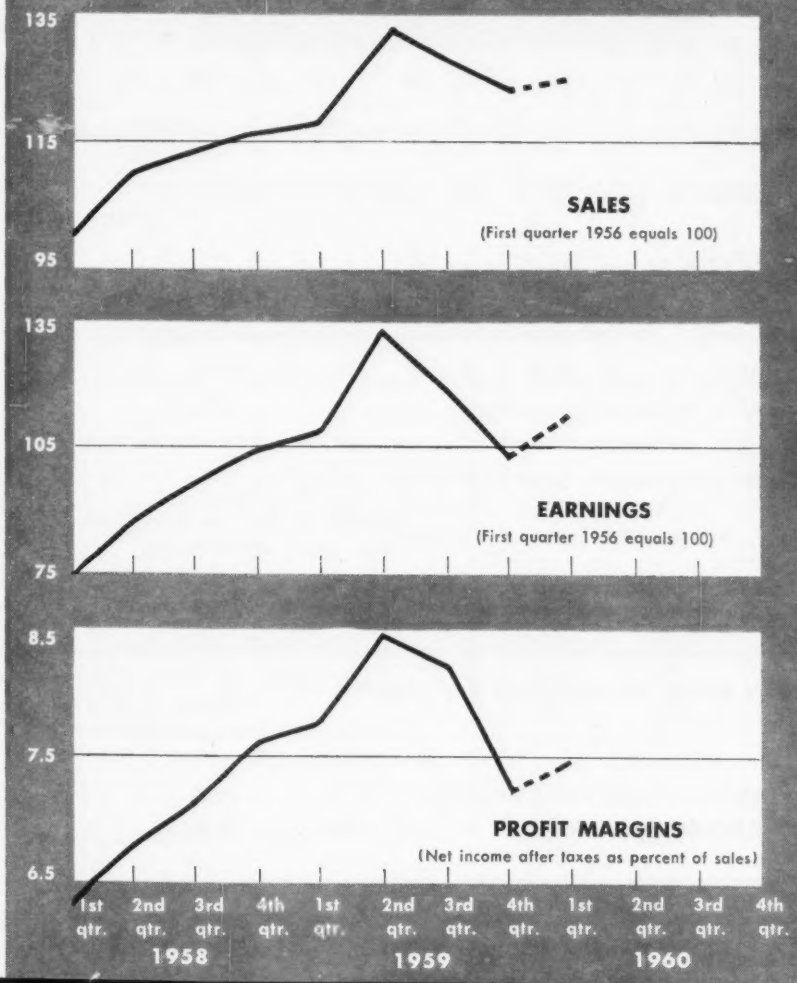
American Cyanamid Chairman Thomas Perkins foresees improvements in both sales and earnings for '60 as a whole. Commercial Solvents President Maynard Wheeler sees a nearly 50% rise in earnings as a possibility, "barring a general downturn in the nation's economy."

	SALES		EARNINGS	
Companies	*1st qtr. 1960**	*Change from 1st qtr. '59*	*1st qtr. 1960**	*Change from 1st qtr. '59*
Allied Chemical	184.2	Up 8.9%	13.5	Up 18.7%
American Cyanamid	159.8	Up 9.5%	16.5	Up 26.6%
Chemstrand	50.2	Down 7.2%	6.4	Down 17.0%
Dow Chemical[1]	182.3	Up 7.6%	16.1	Up 17.5%
Du Pont	535.0	Up 5.6%	67.0[3]	Down 3.6%
General Aniline	39.4	Up 6.9%	1.7	Up 15.6%
Hercules Powder	73.5	Up 14.5%	5.5	Up 13.1%
Hooker Chemical[1]	36.2	Up 3.7%	3.0	Down 6.5%
Monsanto Chemical [2]	212.1	Up 7.2%	16.1	Down 2.9%
Olin Mathieson	163.1	Up 2.0%	8.6	Up 34.0%
Rohm & Haas	56.3	Up 11.4%	5.9	Up 16.0%
Union Carbide	395.3	Up 8.7%	42.1	Up 1.2%

* Dollar figures in millions.

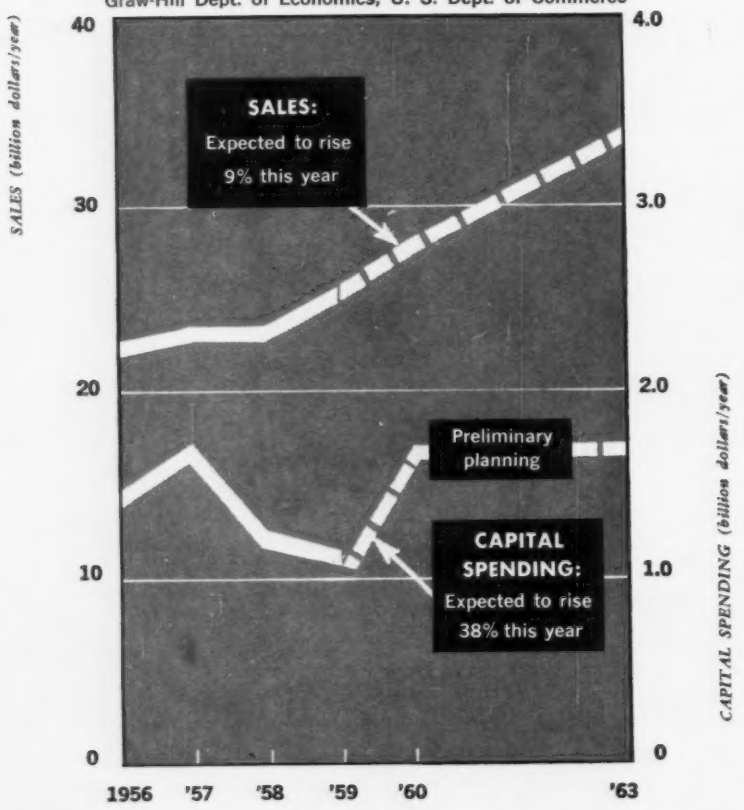
(1) For three months ended Feb. 29. (2) Operating income, estimated by CW. (3) Company now reports on world-wide basis; e.g., total sales include sales of parent company and subsidiaries plus one-half of sales of 50%-owned affiliates.

CW Index of Chemical Industry Sales and Earnings



Chemical Industry* Growth

*"Chemicals and allied products" group. Sources: McGraw-Hill Dept. of Economics, U. S. Dept. of Commerce



CHEMICAL INDUSTRY'S 1960 CAPITAL SPENDING . . .

● ***Is high in proportion to sales:***

	Capital spending as percent of sales
Chemicals and allied products	**6.1%**
All-manufacturing average	**4.0%**

● ***Is venturesome, growth-oriented:***

	Percent of capital spending for— Expansion	Modernization
Chemicals and allied products	**63%**	**37%**
All-manufacturing average	**35%**	**65%**

● ***Is heavy on machinery and equipment:***

	Percent of capital spending for— Buildings	Equipment
Chemicals and allied products	**21%**	**79%**
All-industry average	**30%**	**70%**

Gunning for

While sales were booming during the past three months (*p. 21*), process industry management was approving expansion and modernization projects, one after the other. Result: this year's outlays for new plants and equipment will be up 20-30% from last year, higher than in any previous year except '57.

And CPI managers expect to maintain capital spending at approximately this same high rate through '63. Some 60% of these funds will come from annual set-asides for depreciation, amortization and depletion—which will rise by 10-20% during this period.

These are among principal findings of this year's survey of plans for new plants and equipment, conducted in March and April by the McGraw-Hill Dept. of Economics. Over-all, U.S. business plans to spend a record $37.9 billion on expansion and modernization this year. For all manufacturing industries nearly $10 billion is earmarked for modernization and more than $5 billion for expansion. Result: an increase of about 5% in total U.S. industrial capacity.

Venturesome Spirit: Compared with most other manufacturing, the chemicals and allied products industry shows a more venturesome spirit in this year's capital spending.

Chemical management has decided to boost outlays by 38% from '59 levels, while the average rise for all manufacturing is pegged at only 26.3%.

And while over-all industrial capacity this year is due to climb by 4.7%, to a level 78% higher than end-of-'50 capacity, makers of chemicals and allied products intend to boost capacity by 6.2%, to 107% of the December '50 total. Key to this faster growth tempo: the chemical industry is the only manufacturing group that will be spending more than 50% of this year's capital budget on expansion rather than modernization.

Accent on Speed: In other respects, too, chemical management stands apart in this 13th annual McGraw-Hill survey, being relatively more intent on, and more confident of, a rapid growth pace.

By 1963, chemical companies ex-

'60 Growth

pect their annual sales to be 32% higher than in '59; among all other manufacturing industries the average gain anticipated for '63 is 26%. Chemical management looks for 14% of '63 sales to be in new products; in most other industries—with machinery and transportation equipment as notable exceptions—the outlook is for less than 10% of sales stemming from new products.

The chemical industry plans to invest $119 million in research facilities this year—considerably more than any other industry, and more than one-sixth of the total for all manufacturing. Only three other industries —aircraft, electrical equipment and machinery producers—have larger research and development budgets for the next few years.

(Replying to a new question in this year's survey, chemical management split on determination of R&D expenditures. Forty-two percent of the responding companies say they relate their research budgets to plans for new products; 27% relate them to annual sales; 11% to annual earnings; 6% to capital invested; and 12% to other factors.)

Wagering on New Products: Fifty-five percent of the chemical companies participating in the survey stated that a significant share of '60 capital expenditures will be invested in facilities for production of new products. In manufacturing as a whole, only 32% answered "yes" to this question.

The companies estimate their aggregate depreciation allowances will rise by 19% to more than $1.3 billion in '63, and 82% of them affirmed that it's their policy to spend all or nearly all of depreciation allowances for new plants and equipment.

In the '59 survey, chemical management was keen for the Middle Atlantic states; projects in those states were to get 25% of the industry's '59 investments, compared with only 16% in '58. But this year, the South Atlantic states are getting the biggest increase, from 19% of '59 spending to 27% of this year's larger total; and next year, the Far Western states will be in for the big boost, from 5% of this year's budgets to 11% of '61 budgets.

CPI Capital Spending: Big Jump in '60

(In million dollars/year. Sources: McGraw-Hill Dept. of Economics; U. S. Dept. of Commerce.)

Industry Group	ACTUAL SPENDING			ANTICIPATED FOR 1960		
	1957	'58	'59	One year ago	Six months ago	Now
Process industries:						
Chemicals, allied products	1,724	1,324	1,235	1,441	1,473	1,704
Paper, allied products	811	578	630	617	828	788
Petroleum, coal products	3,453	2,431	2,491	2,325	2,665	2,840
Rubber products	200	134	190	188	233	266
Primary nonferrous metals	814	441	313	368	357	369
Stone, clay, glass products	572	399	529	469	603	695
CPI totals	7,574	5,307	5,388	5,408	6,159	6,662
All manufacturing industries	**15,959**	**11,433**	**12,067**	**10,448**	**11,957**	**15,243**

CPI Sales: Outlook for Growth

(In million dollars/year. Sources: McGraw-Hill Dept. of Economics; U. S. Dept. of Commerce.)

Industry Group	ACTUAL SALES			ANTICIPATED	
	1957	'58	'59	'60	'63
Process industries:					
Chemicals, allied products	23,424	23,220	25,749	28,066	33,960
Paper, allied products	10,776	10,985	12,157	13,130	15,362
Petroleum, coal products	34,848	33,208	37,077	38,560	42,416
Rubber products	5,760	5,422	6,119	6,547	7,595
Primary nonferrous metals	8,350*	7,800*	9,500*	10,165	12,605
Stone, clay, glass products	8,484	7,683	8,708	9,230	10,891
CPI totals	91,642	88,318	99,310	105,698	122,829
All manufacturing industries	**340,596**	**314,957**	**356,848**	**385,396**	**450,913**

Research and Development Budgets: Keeping Pace with Sales

(In million dollars. Source: McGraw-Hill Dept. of Economics.)

	R & D Operating Budgets			Expenditures for research facilities
Industry group	1959	'60	'63	1960
Process industries:				
Chemicals, allied products	661.8	714.7	850.5	119
Paper, allied products	63.4	76.7	95.9	24
Petroleum, coal products	300.7	315.7	347.3	60
Rubber products	89.3	95.6	111.9	5
Primary nonferrous metals		(Not Available)		7
Stone, clay, glass products	73.6	83.9	104.9	30
CPI totals	—	—	—	245
All manufacturing industries	**8,656.4**	**9,139.5**	**10,226.2**	**682**

OM's Osborne calls a moratorium on buying or selling properties.

OM Talks Research

Olin Mathieson President Stanley de J. Osborne went downtown to New York's financial district last week, broke bread with some 300 security analysts, and told them just about everything except what they really wanted to know: if and when OM's directors will boost the 25¢/share quarterly dividend rate back to the 50¢ level of two years ago.

Aside from steadfast silence on this point, Osborne was amiably communicative. Among the items covered:

- Improvement in first-quarter earnings (*table, p. 21*). Chief factor in this was that last year's "substantial" losses on aluminum operations have been cut to 4¢/share.
- Research and development expenditures, revealed for the first time. Over the past three years, company-sponsored research budgets have been boosted 50%, to the current $18 million/year. Half of this is for the Squibb division's pharmaceutical research; most of the remainder is for chemical research. OM's government-sponsored research, however, is down from $10 million to $7 million/year.
- New emphasis on organic chemicals, mainly derived from hydrocarbons from natural gas. The chemical division's $35-million expansion program, now under way, is concentrated in this area.
- Future growth from within. "As far as I'm concerned," Osborne declared, "we are not buying any new properties, especially if they're not in our six present lines of business."

Next for Dixon: HF

With last week's signing of a $3.5-million contract for construction of a hydrofluoric acid unit at Paulsboro, N.J., the Dixon chemical companies are nearing their expansion goals.

By next year, this five-year-old corporate trio—Dixon Chemical & Research, the parent company; Dixon International, 100%-owned; and Dixon Chemical Industries, managed and 27%-owned by DC&R—will be producing three of the six heavy chemicals in its product line: sulfuric acid, aluminum sulfate and hydrofluoric acid. The company is also a merchant supplier of salt cake, caustic soda and muriatic acid.

The new HF unit will use the Swiss-imported Buss process (*CW, March 12, p. 43*). Completion date: early '61.

Last year, DC&R sales soared 46%, to $3.95 million. Net earnings amounted to $302,857—up from a $55,602 loss (excluding nonrecurring charges) in '58.

Century's New Capital

Century Chemical Corp. (New York) passed another financial milestone last week when it issued its first set of debentures, consisting of $1.85 million of 6% notes—$1.5 million secured, $350,000 subordinated. The debentures were placed with private interests by Stone and Webster Securities Corp.

Proceeds from the sale, according to company President Theodore S. Hodgins, will be used to retire short-term debts and as working capital for present operations and planned expansions.

Latest acquisition to be completed by Century: formal signing this week of an agreement to acquire 100% of the stock of W. A. Butler Co., Inc. (Harrisonburg, Va.), an animal feed and supply company (*CW, April 2, p. 16*).

New Chemical Export Pattern

	'59 Exports ($ millions)	Change from '58	Share of total
Total chemicals, related products	$1,475.6	up 8.9%	100%
Canada	263.2	up 8.9%	17.8%
Latin America	404.1	up 0.3%	27.4%
Western Europe[1]	429.8	up 15.8%	29.1%
Asia	241.0	up 18.6%	16.3%
Near East[2]	47.9	Down 16.4%	3.2%
Africa[3]	38.8	up 10.5%	2.6%

[1] excluding Greece and Turkey; [2] includes Greece, Turkey, Egypt and the Sudan; [3] excluding Egypt and the Sudan.

New Export Pattern

A new chemical use pattern emerging from the chemical industry's standout export performance last year (*CW, Feb. 20, p. 23*) is outlined in a new U.S. Dept. of Commerce study released last week.

While total U.S. exports slipped slightly in '59, producers of chemicals and related products enjoyed an 8.9% boost in overseas shipments. Buying power in many important U.S. markets was weakened by declining basic commodities prices, but renewed industrial vigor in most of this country's chemical outlets pepped up demand.

The most significant increase came in exports to Western Europe. The largest factor in the surge was specialty chemicals, exports of which rose 22.6%, to $180 million. Industrial chemical exports were up 21.1%, to $94.1 million; and exports of fertilizers shot up 73.8%, to $18.6 million. Coal-tar chemicals and pharmaceutical and medicinal preparations, in fact, were the only subgroups showing an export decline in the area. Drugs slipped from $59.5 million to $57.8 million, while coal-tar chemicals were down from $43.5 to $40.6 million.

Japan's booming economy explains most of the boost in U.S. sales to Asia. Again, the big gains came in specialty chemicals.

COMPANIES

Dayco Corp. (Dayton O.), formerly Dayton Rubber, has formed Dayton Dayflex Plastics Co. as a division to take over manufacturing, sales and other operations of the former Dayflex Plastics Division. The new unit will also develop, test and manufacture "new, highly specialized plastic products" under General Manager S. K. Lamden.

•

J. M. Huber Corp. (Hillside, N.J.) has purchased Courtenay Ink Co. (Louisville). Price was not disclosed.

•

Food Machinery and Chemical Corp. has increased the quarterly dividend rate on its common stock to 35¢/share—a 16.7% increase over the prior rate.

•

Richardson Co. (Newnan, Ga.) has been purchased —for about $1 million— by the newly formed Newnan Corp., manufacturer of high-pressure decorative laminated sheets. The company will be owned and operated entirely by a group of Southern business men, is scheduled to be in operation in about one month.

•

Brush Beryllium Corp. (Cleveland) is seeking registration with the Securities & Exchange Commission of 410,206 shares of common stock (260,000 to be offered for public sale by the company, 150,206 shares to be offered by the holders). Of the proceeds, $6 million will be used for increasing the firm's beryllium metal production capacity (*also see p. 92*), and the remainder for expanding the company's fabricating facilities.

EXPANSION

Paper: Bowater Corp. will add two paper machines to its pulp and hardmill facilities at Rock Hill, S.C. The $60-million expansion is expected to push Bowater's South Carolina investment total to nearly $100 million in less than a year after the original plant opened. The British-owned company says the first machine will be installed immediately. The product: "one not now being made in this country," according to a Bowater official.

•

Coke: New York Mining and Manufacturing Co. (Dorchester, Va.) will construct a several-million-dollar coke plant at the company's headquarters. The plant, expected to be in operation by next January, will be located on a 480-acre site along the Tennessee River. Principal customer: Air Reduction's National Carbide Division plant at Calvert City, Ky. Coal will come from Kentucky and West Virginia.

•

Pharmaceuticals: A. H. Robins Co. (Richmond, Va.) has begun construction of its first Canadian office and plant near Montreal. The $700,000 facility will house manufacturing, packaging and research units.

Tungsten, Molybdenum: Metals & Residues, Inc. (Springfield, N. J.), producer of refractory metals, has installed new reduction facilities for production of high-purity tungsten and molybdenum using the Supiro process and is increasing production capacity 10-fold.

•

Plant Site: Wyandotte Chemicals (Wyandotte, Mich.) has purchased a plant in Washington, N.J. The plant, being studied as a new factory site, was built by Dixie Waxed Paper Co. in '52 and vacated several months ago.

FOREIGN

Acrylonitrile/France: Britain's The Distillers Co. has entered into an agreement with the French firm Ugilor, under which Ugilor can use Distillers' know-how and patents to build a plant for making acrylonitrile from propylene and ammonia. Distillers has been working on the process for several years, but does not make acrylonitrile itself. Ugilor produces the material through the conventional acetylene-hydrogen cyanide route, has researched the propylene-ammonia process, will design, build and own the new plant.

•

Nylon/England: British Enka Ltd. and Dutch fiber giant AKU will build a jointly owned plant in the United Kingdom for production of nylon-6 polymer and yarn.

•

Pharmaceuticals/Australia: Hoechst Pharmaceutical Pty. Ltd., a subsidiary of Farbwerke Hoechst and the Australian firm Fawns and Macallan Pty. Ltd., is starting operations in Melbourne.

•

Chemical Equipment/U.S.S.R.: Russian output of chemical equipment fell short of stated goals during first-quarter '60. Output was valued at 80 million rubles —$20 million at the official exchange rate.

•

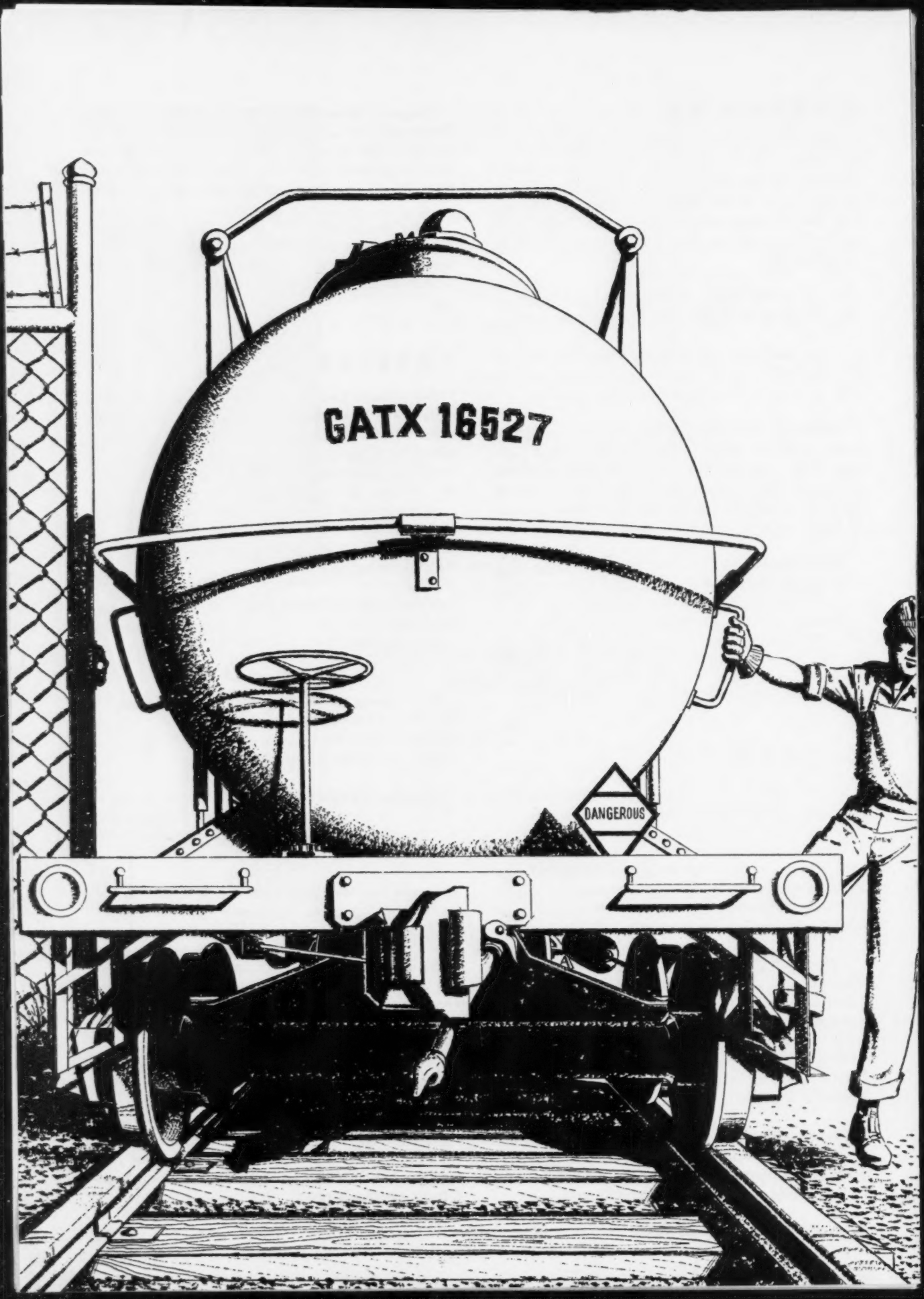
Carbon Dioxide/Israel: Fertilizers & Chemicals Ltd. has put into operation a German-equipped 12-tons/-day liquid and solid carbon dioxide plant in Israel.

•

Petrochemicals/United Kingdom: British consumption of petrochemical feedstocks rose sharply last year. They account for the bulk of the oil group's "other products," which rose 52.7%, to 1.4 million long tons in 1959.

•

Rosin Derivatives/Netherlands: Hercules Powder Co. will put up a 30-million-lbs./year plant at Zwijndrecht, near Rotterdam. Products will include rosin size for the paper industry, synthetic resins for protective coatings and other industries, and other rosin derivatives. The company recently formed a Swedish subsidiary to build a paper chemicals plant.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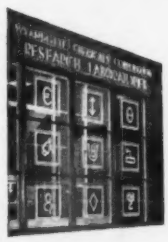

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Washington
Newsletter

CHEMICAL WEEK
April 30, 1960

Washington economists are beginning to worry about "creeping inflation" again. Causing concern: food prices, which reversed a long downward trend in the latest wholesale price index.

Thanks to falling food prices, the consumer price index has remained stable during the past two years in spite of steadily rising industrial prices. If the new trend in food prices holds, the price index is likely to rise. This would mean automatic wage increases for millions of workers who have cost-of-living contracts, setting off another round of upward pressures.

While few economists are forecasting any dramatic increase in inflation, most feel there could now be a pronounced period of creeping inflation. Food prices in the next few months will be watched with keen interest.

•

A controversy over releasing surplus corn to make industrial alcohol is giving Agriculture Secy. Benson some second thoughts. He may cancel out the plan in view of sharp protest from the oil-petrochemical industry (*CW, Viewpoint, March 26, p. 5*).

At stake is a 260-million-gal. industrial alcohol market, dominated by oil companies that synthesize the alcohol and ship about half their output to other petroleum and petrochemical processors. Standard Oil of New Jersey protests that the 30 million bushels of corn the Agriculture Dept. wants to release for producing alcohol would make only a small dent in the government's quarter-billion-bushel surplus. But that much corn would make 84 million gal. of alcohol, or about one-third of the total market, seriously disrupting the industry.

An important point is that this would be subsidized alcohol production. Making the product from corn is much more expensive than from petroleum. Hence the surplus corn would have to be sold for half the support price of $1.50/bushel to make it economical for anyone to process it into alcohol.

According to insiders, the decision as to rescinding the surplus distribution could go either way.

•

Senate drug probers open up on antidiabetic drugs this week. Upjohn's Orinase and Pfizer's Diabanese are chiefly involved.

Support for brandnames vs. generic names in drug prescriptions was given last week by Dr. Austin Smith, president of the Pharmaceutical Manufacturers Assn. He showed that of all FDA seizure actions in the past six years, non-PMA members (which more often account for off-brands) represented 139-203/year, while PMA members had only 6-10/-year.

Dr. Smith scored the Kefauver Committee for charging "mo-

nopoly" at the same time it is chastising the industry for overly competitive promotion. "The drug industry can't be both too concentrated and too competitive," he said. He noted there are 1,300 drug firms and none can claim more than 10% of the total market. Kefauver emphasized, however, that on specific drugs one or two companies sometimes dominate the market.

GOP leader Everett Dirksen, incidentally, is not holding to his threat to block the committee from meeting any time the Senate is in session. Last week he let the hearings go on during session time.

•

Import tariff boosts on lead and zinc as a replacement for present import quotas depend on unified industry support. Large and small producers, smelters, even importers, now favor higher duties over current quotas, but are having trouble getting together on what the new rates should be.

Industry representatives met with mining-bloc senators at a closed-door session last week, but will not talk rates until later meetings. Mining-state senators would like to write new tariffs into law, but the White House would prefer to make the move administratively through the Tariff Commission when the quotas come up for routine periodic review next fall.

Nevertheless, if the divergent industry groups can't unite on a basic new tariff rate—say 2-2½¢/lb.—chances are slim that the mining bloc can pass a law, or even that the Administration can justify removing the present quotas.

•

The bill to grant tax incentives for overseas investment now appears a better than even bet for passage. House Ways & Means Committee last week amended it to remove controversial provisions objected to by the Administration, industry and labor. Main change would limit the tax benefits to companies doing business in so-called "less developed" areas. The measure must still win approval by the House, Senate and President. But passage could come quickly, now that it appears to be acceptable to nearly everyone concerned.

•

The controversy over advertised bidding vs. direct negotiation with prime- and subcontractors for federal contracts grows sharper with release of a new Pentagon report.

An analysis of prime contract awards to the 25 leading defense contractors in '59 shows: (1) only 1% of the awards were made on a formally advertised basis; (2) the top 25 firms got more than half of all contracts placed.

The report will be new ammunition for congressmen pressing for more competitive bidding and more emphasis on small business.

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*Patents pending

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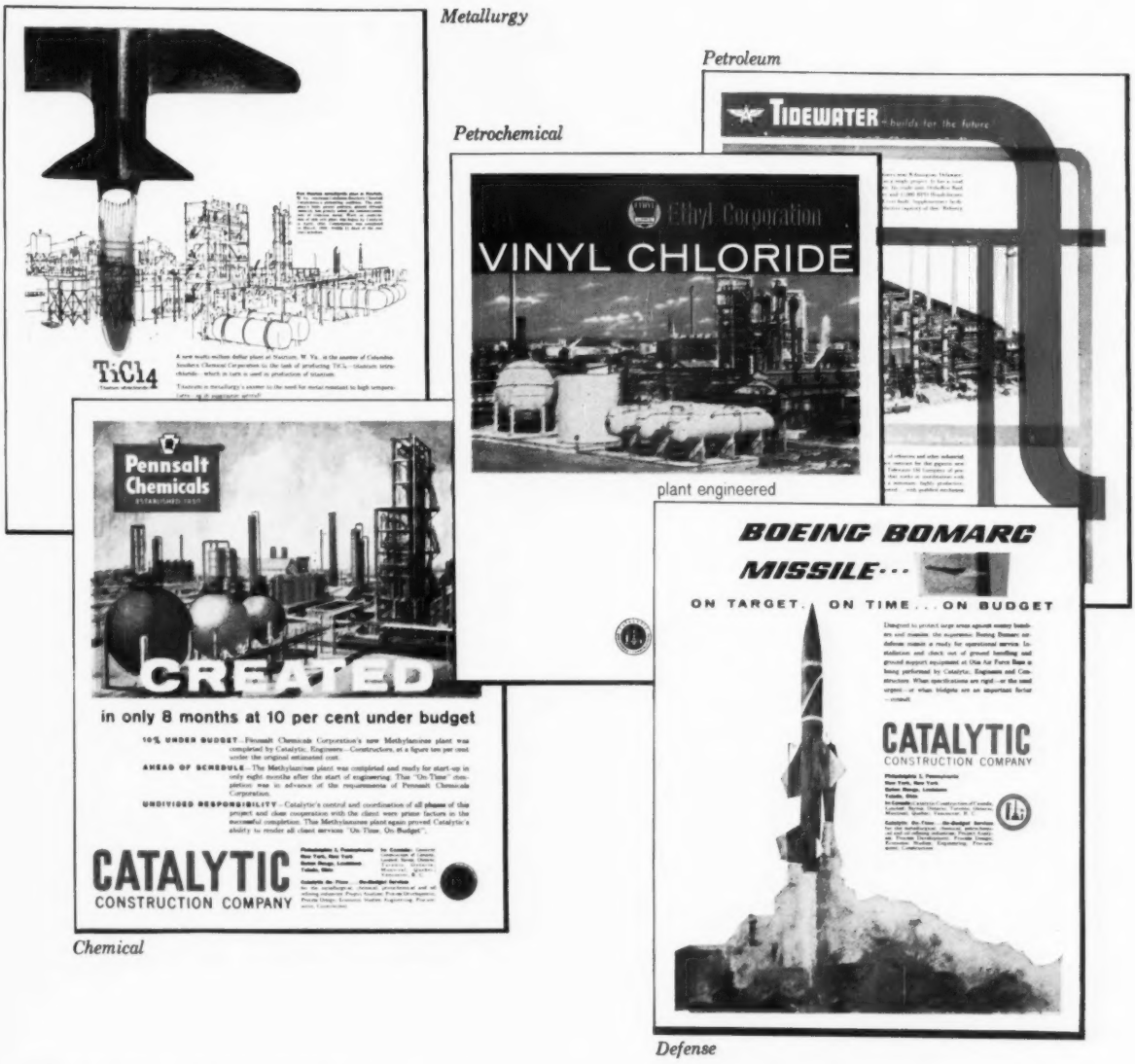

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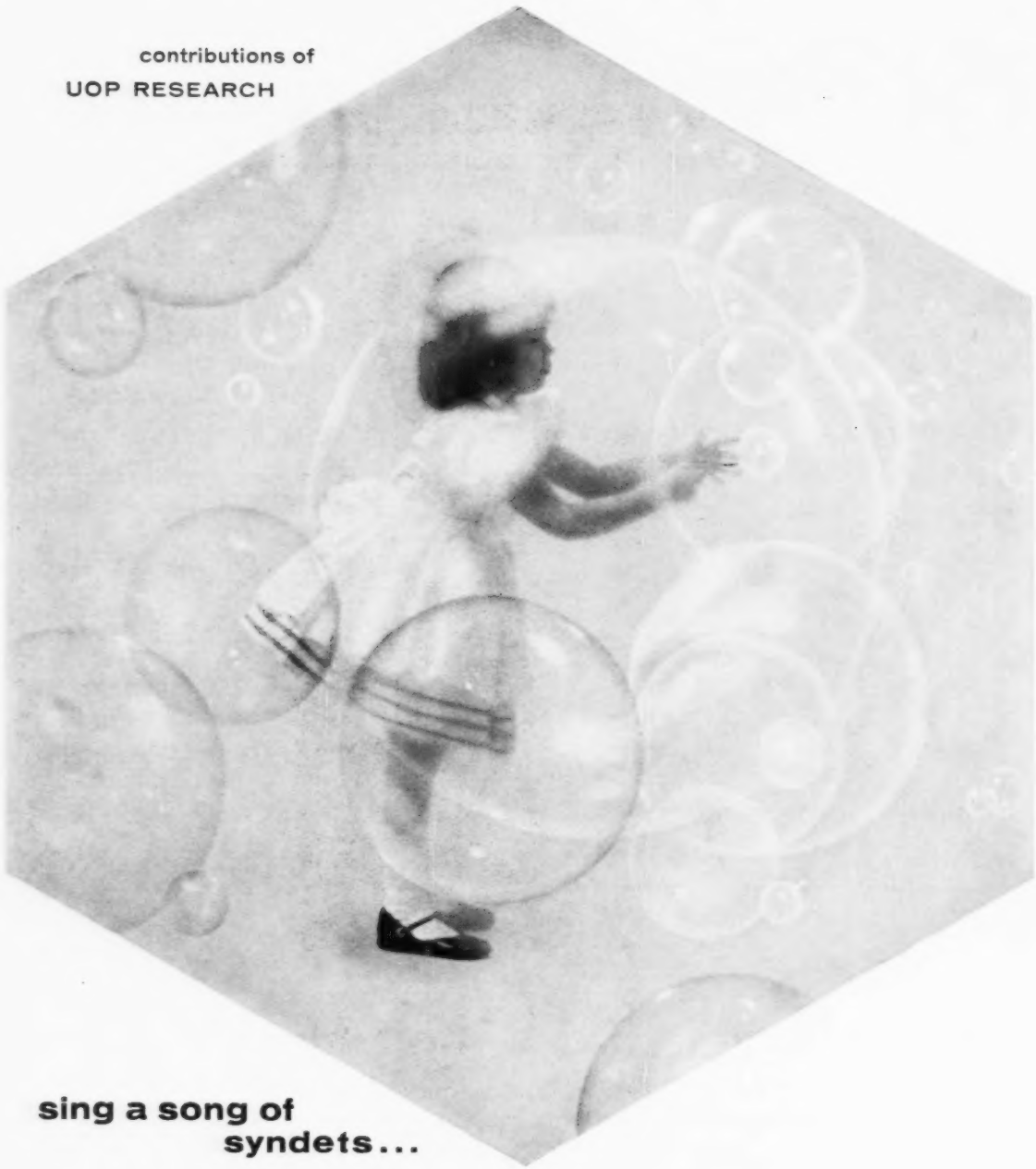

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WHERE RESEARCH TODAY MEANS PROGRESS TOMORROW

Lineup of Photosensitive Systems Incorporating Plastics

Company	Materials	Process	Applications	Status
Eastman Kodak	Cinnamate esters of polyvinyl alcohol plus activators	Crosslinking with ultraviolet light; washing away unreacted material	Masking for metal etching	Commercial
Kalvar	Thermoplastic layer containing diazonium salts	Ultraviolet decomposition of diazo salts, followed by heating to enlarge nitrogen bubbles, which leave light-scattering (opaque) areas in plastic	Microfilm copying	Commercial
Du Pont	Photopolymerizable monomer and activator in binder on metal backing	Ultraviolet polymerization; washing away unreacted monomer	Printing plates	Going commercial
Azoplate	Photoconductive organic layer on paper or metal	Charge collects on exposed areas, attracts toner material in manner similar to Xerography	Lithographic plates	Going commercial
Time	Alcohol-soluble polyamide interpolymer	Ultraviolet insolubilization; washing away unreacted material	Printing plates	Developmental
Ferro	Vinyl resin with ultraviolet-sensitive additives	Resin is polymerized by normal methods, then selectively degraded by exposure to ultraviolet light	Permanent records	Developmental
Haloid Xerox	Vinyl resin with reducible dye and weak reducing agent	Free radicals produced by light-activated reaction initiate polymerization of vinyl; washing away unpolymerized resin	Photographic and printing products	Developmental

Photopolymers Start Their Move to Market

Photosensitive systems based on plastics are moving closer to commercialization this week in a number of uses, particularly printing and lithographic plates and photographic prints (see table, above). Highlighting advances in this active field of research are three new developments at Polytechnic Institute of Brooklyn.

And the manufacturer of an already commercial material (for microfilm copying) last week introduced new equipment to extend the markets for its product. Meanwhile, another manufacturer reports brisk sales of a photopolymer masking material, and several others are moving in on various printing and photographic markets.

Although the plastic is essential to each of these new systems, it is utilized in varying ways. Light-activated polymerization, cross-linking and degradation are the basis of different systems. And in others the plastic is physically deformed or used as a conducting surface.

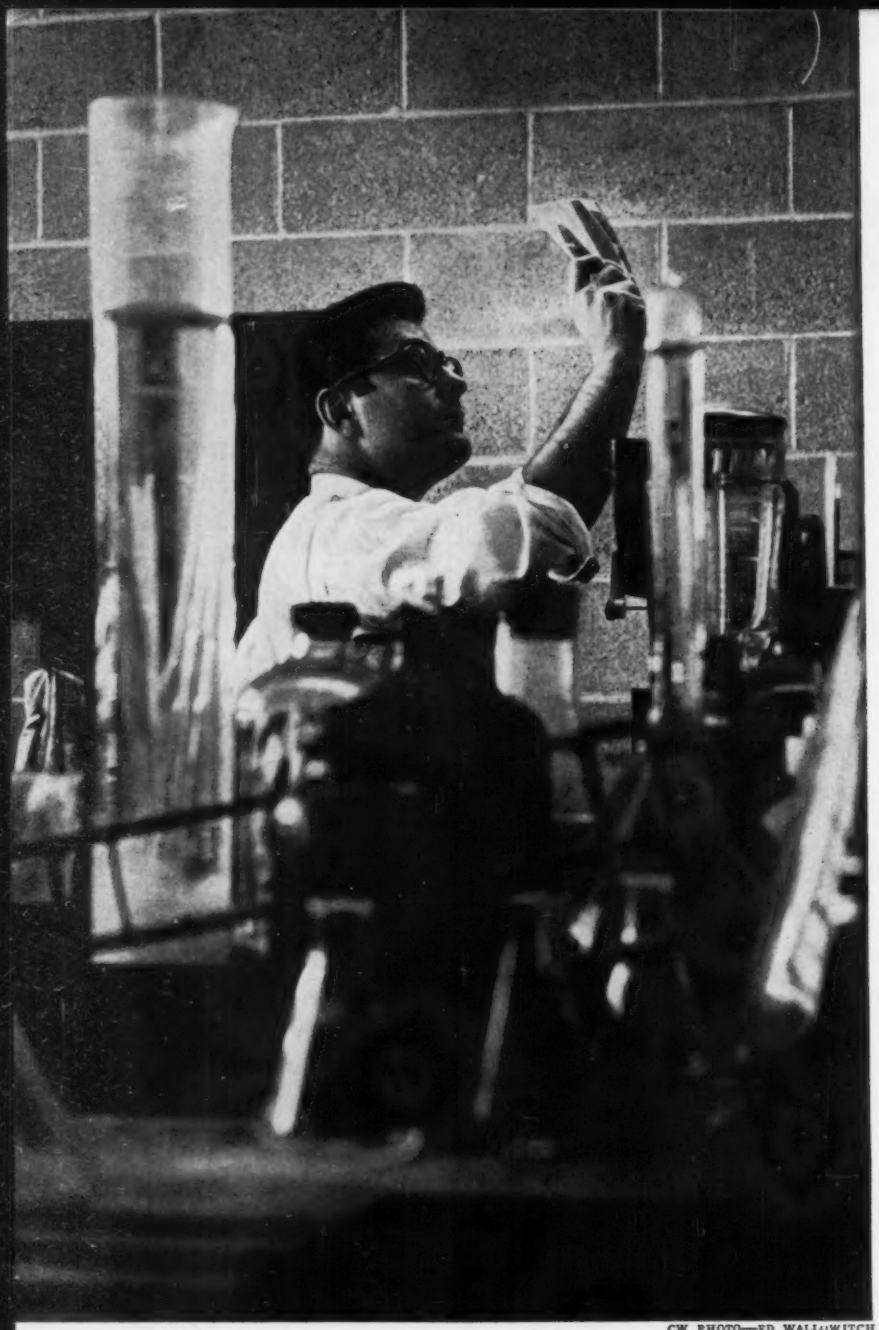
New Lab Finds: One of the most prolific contributors to the photopolymer field is Gerald Oster of the Institute for Polymer Research at Brooklyn Polytech. In a lecture tour of Japan last month he unveiled three new systems offering intriguing possibilities. And an earlier discovery is getting commercial scrutiny from Haloid Xerox, Inc. (Rochester, N.Y.).

Haloid's interest is centered in a dye-sensitized photopolymerization process, to which it has acquired Oster's patent rights (U.S. 2,850,445 and 2,875,047). The system is made up of a vinyl monomer, a dye and an agent that can reduce the dye only when activated by visible light. The reduced dye reacts with oxygen to yield free radicals, which promote polymerization of the vinyl compound.

Haloid says only that it's working on "several interesting applications," but Oster reports that he has used the method to produce a printing plate, a lithographic plate, a photosensitive mimeograph master and a diffusion transfer paper.

New Trio: Oster's three new systems all use the dye-sensitization principle, but in different ways.

(1) One involves a cross-linking re-



CW PHOTO—ED WALLOWITCH

Brooklyn Poly's Oster checks new photoplastic image for clarity.

action in which the reducing agent is part of the polymer. A gelatin containing a very small percentage of mercaptan groups is used. These groups serve as the reducing agent for the dye, form disulfide bridges between polymer chains. The cross-linked portions are then insoluble in hot water, giving a system that Oster says shows promise in the direct production of color plates from transparencies.

(2) Oster has also developed a dye-sensitized version of the classical bichromate photographic process. Although normal reducing agents would reduce the bichromate ion even in the absence of light, chelating agents (such as ethylenediamine tetra-acetic acid) can be used to reduce the light-excited dye molecule, thus triggering the reaction. Oster says that this reaction appears to be far more sensitive than the ordinary bichromate process, may be useful for direct color-plate production (from single-color negatives), enlarging and application in reflex copying cameras.

(3) The third system is based on a de-cross-linking reaction. Polyacrylamide, for instance, can be cross-linked by mercuric ion to form a clear, tough gel. The dye-sensitized photoreaction, however, can be used to reduce the mercuric ions to mercurous, which do not serve as cross-linking agents. Thus, the gel is broken and can be washed away. Oster proposes an interesting three-layer system that could be used in direct color photography.

Hardware Advance: New photopolymer discoveries generally lead to the need for special equipment that would make the best use of the new product. Kalvar Corp. (New Orleans) is now working up new pieces of equipment to utilize a product that's been technically proved out. The latest—a viewer-copier for its microfilm copying material—was shown for the first time at last week's annual meeting of the National Microfilm Assn., at New York's Statler-Hilton Hotel. The new unit allows a single frame of roll microfilm to be viewed on a screen, then copied onto a record card. Several documents from different rolls of film can be copied onto the card, thus allowing related information from different files to be stored together. The new machine is also used to view the copies. Other units in work: an enlarger to make full-size copies of microfilm originals (e.g., of engineering drawings); equipment to produce "hard copy" (prints) from microfilm; and a roll-microfilm copier that continuously develops and fixes the copy in the same unit.

Kalvar's basic product—developed several years ago by the New Orleans printing firm of Thomas J. Moran Sons—is a two-layer film. The base layer is Mylar, chosen for its strength and dimensional stability. Coated on the base is a thin film (about 0.5 mil) of an unnamed thermoplastic containing a diazonium salt. The diazo compound breaks down upon exposure to ultraviolet light, yielding finely divided nitrogen gas in the plastic. Heating the film for a few seconds at about 255 F softens the plastic, allowing the nitrogen to form larger bubbles, which in turn produce crystal-like interfaces in the plastic. Light is scattered by these interfaces, giving an opaque appearance to exposed areas. Big advantage is that developing is done by heat alone, requires no chemicals.

When the project grew too big for

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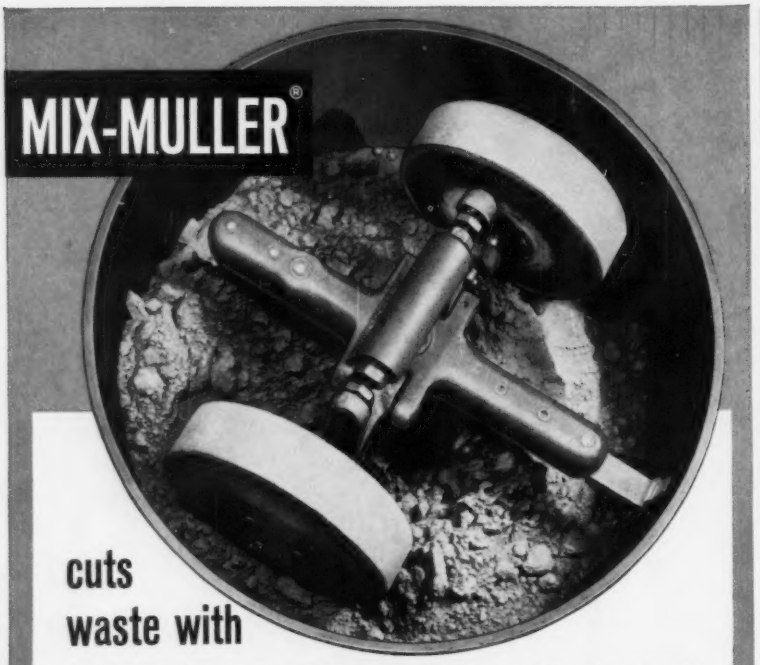

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DRY SOLIDS MIXING IS OUR ONLY BUSINESS

New microfilm viewer-copier gives

the Moran firm, Kalvar was formed in '56. According to Executive Vice-President Glen Magnuson, Kalvar is satisfied with the technical development of its film, but must continue to work on new "hardware" that will open markets for the film.

Special equipment must also be developed for another system, also aimed at the information storage field. Ferro Chemical Corp. (Bedford, O.) has been working on a specially sensitized vinyl film that can be used to make permanent records. Although the product has been proved out on a technical basis (*CW Technology Newsletter, Dec. 15, '56*), the need for suitable equipment and market studies to keep it in the developmental stage.

The composition supplied by Ferro (in experimental quantities only) is a mixture of vinyl resin, plasticizer and additives in a volatile solvent. A thick vinyl film (5-10 mils) is formed on a metal backing, and is then ready for exposure (through a negative) to ultraviolet light. Subsequent heating brings out a picture that is said to be sharp, tamperproof and permanent.

Key to the method is in the additives, which control the customary degradation of vinyls in the presence of light and heat to give a black color, rather than the yellow or brown generally produced.

Printing Plates: One of the biggest beneficiaries of photosensitive plastic-containing systems will be the printing industry. First commercial development: Du Pont's Dycril printing plates, which have been field tested

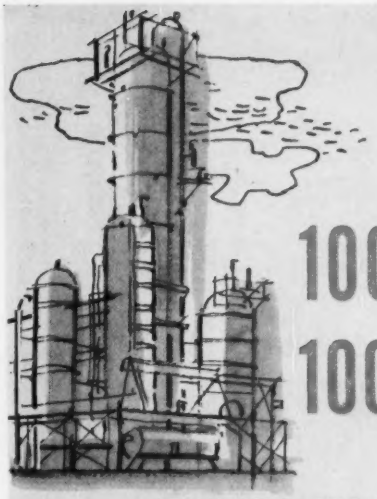
Kalvar's plastic an added sales push.

for three years, will be produced commercially in a new plant at Parlin, N.J., in '61 (*CW Technology Newsletter, Jan. 23*).

The material supplied by Du Pont consists of a metal support, an antihalation layer (to prevent light reflection), a bonding layer, and a 30-40-mil-thick photopolymerizable layer. Exposure to ultraviolet light through a negative polymerizes the material, which is then left in relief by washing away the unreacted material with a dilute alkaline solution.

The company has been very secretive about the contents of this last layer (saying only that it's a monomer, not nylon). However, some recent Du Pont patents in this area (U.S. 2,927,022-3 and Australian application 50,569/59) refer to an ethylenically unsaturated monomer, while earlier ones (U.S. 2,760,863 and Australian application 37,364/58) mention acrylic esters. Some refer to a polymeric binder, while others mention ethers or esters of polyglycols or cellulose. And initiators for addition-polymerization are frequently mentioned. A possible system: a cellulosic binder, which also serves as a backbone with which the monomer could be polymerized.

Time, Inc., has also been working on plastic printing plates, has developed a polyamide plate at its Springdale, Conn., labs. Starting material is a soluble interpolymer (such as the chemical mixture of nylon-6, 6,6 and 6,10 sold by Du Pont). The publishing firm adds light-sensitizing additives. Ultraviolet light hardens exposed areas; other portions are



1001 + CH_3OH +
1002 + CH_3OH =

REICHHOLD CHEMICAL'S FORMULA FOR TRANSPORTING METHANOL MORE EFFICIENTLY: INGALLS-BUILT BARGES

REICHHOLD 1001 and REICHHOLD 1002... these two barges were designed by Ingalls to carry Methanol for Reichhold Chemicals, Inc., Tuscaloosa, Alabama. Each barge is 195′ x 35′ x 10′6″, has a capacity of 420,000 gallons, and is equipped with an efficient pumping system.

Today, more and more companies are turning to barges to gain economy and efficiency in the transportation of chemicals. Ingalls has designed and built a large number of all such barges operating on the waterways of this country and its experience is available to you for the solution of your particular transportation problems.

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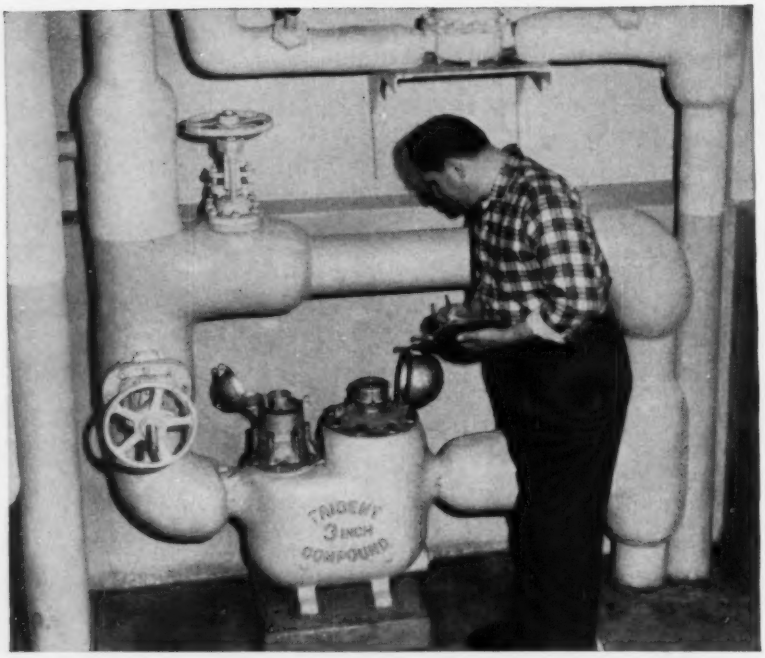

How Ansco's 101 NEPTUNES save millions of gallons daily

Snapshots at popular prices depend to an amazing extent on *water*. Ansco Manufacturing Company, Binghamton, N. Y., needs many million gallons every day... water for vital heating, cooling, air conditioning... expensively treated water for chemical processes.

Cutting water costs to the bone, Ansco has found ways to re-circulate and re-use water an average of *2½ to 3 times* before it is reluctantly released.

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If water is important to *you*, make sure you too are saving all you can with meters. We'll gladly make a survey. No obligation, of course.

Life History of a Gallon of Water at Ansco

1. Well water at 53° used first for air conditioning
2. Chlorinated, used for spray washing
3. Used in chemical dehumidifier
4. Passes through heat exchanger
5. Passes through ammonia condenser
6. Goes to fire protection reservoir
7. Finally used to cool roof

GET THE FACTS
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washed away with an organic-alcohol solution, leaving a relief image.

Although the new plates have been used experimentally to print a few pages of Time, they are awaiting full economic justification, especially in regard to adding the negative-producing step to the printing operation.

A plastic-using lithographic plate, under development at Kalle & Co. AG. (Wiesbaden, Germany), is expected to be offered commercially in this country by Azoplate Corp. (Murray Hill, N.J.) by the end of this year. (Farbwerke Hoechst, Kalle's parent company, acquired control of Azoplate in Jan. '60.)

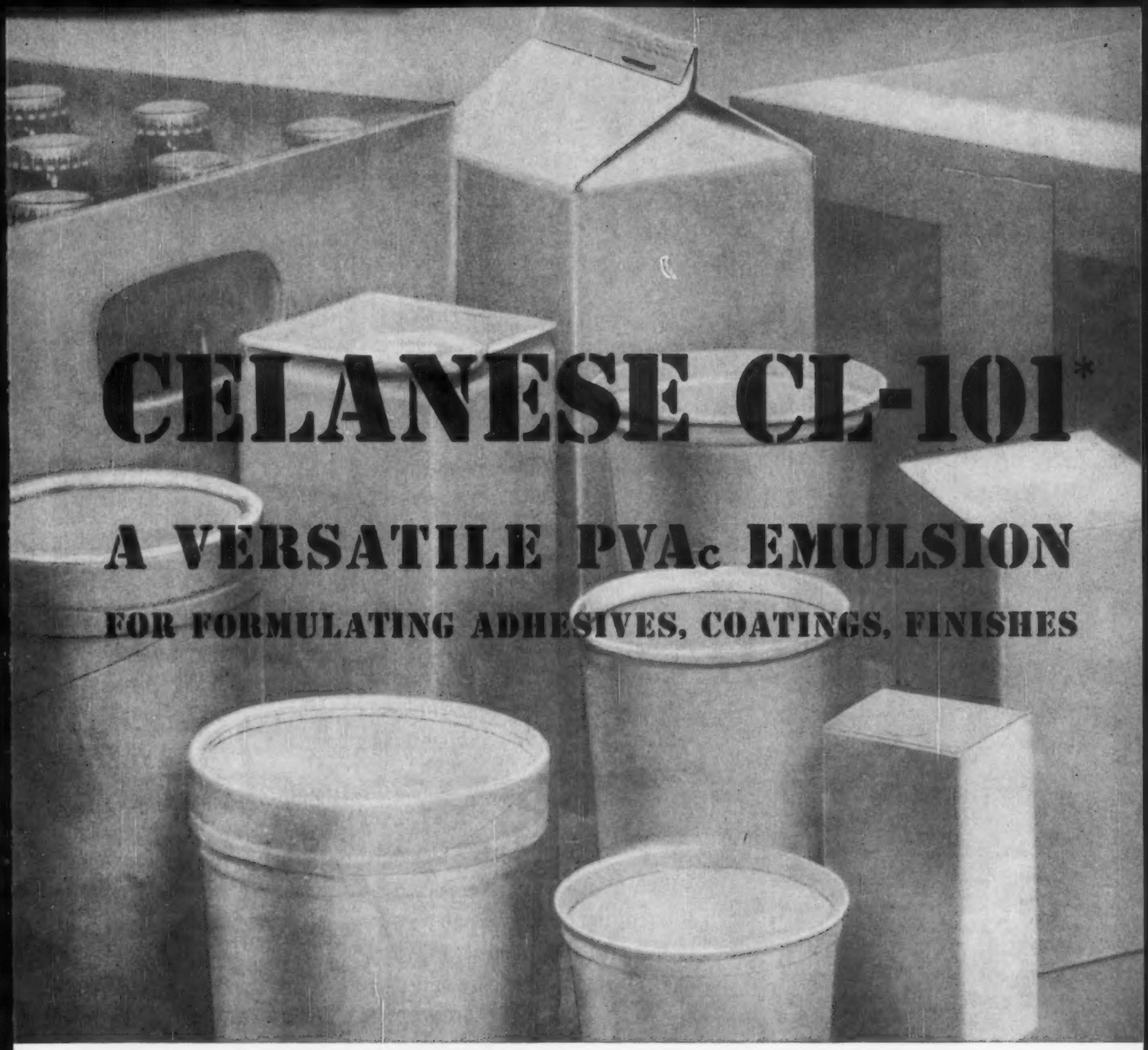
Operation of this system is similar to conventional Xerography in that a toner is spread over a charged, illuminated surface, adhering to the illuminated areas, which collect the charge. Difference is that the surface of the German plate is a photoconductive organic layer on a paper or metal backing. Thus, it can be used directly as the plate, cutting out the transfer step.

Selling Nicely: Eastman Kodak Co. (Rochester, N.Y.), deep in research on all kinds of photosensitive materials, has been working on polymers for about 15 years. It reports most success with additive-sensitized cinnamate esters of polyvinyl alcohol.

Commerical products from this research—Kodak Photo Resist (KPR) and the newer Metal-Etch Resist (KMER)—are widely used as masking compounds for various etching jobs. Ultraviolet light makes exposed portions insoluble, allows washing away of the material from the area to be etched.

Big Future: Photopolymer systems appear to be in for continued emphasis. The Air Force, for instance, is taking a close look. Technical Operations, Inc. (Burlington, Mass.), was recently commissioned by the Wright Air Development Division to evaluate a photopolymerization technique for use in a new photographic process. Tech/Ops won't say what the system is, but claims it would produce finished pictures on the same film used to take the picture—with no liquid processing.

Government, industry and university interest in photopolymers all adds up to one thing: an optimistic future for these new materials in a variety of applications.



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- CL-101 . . . 1000 cps
- CL-101-E . . 3000 cps
- CL-101-H . . 1500 cps
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CL-101 is also an excellent coating material for paper and cardboard in food packaging, imparting grease- and scuff-resistance. A wide variety of F.D.A.-acceptable packaging is made possible, including cardboard and corrugated boxes, containers, lids, paper bags, layer separators for candy, and laminated materials. ■ The versatility of CL-101, the high bond strength of its films and easy clean-up of machinery are creating an increasing demand for this water-based emulsion. ■ Make Celanese your dependable source of supply for PVAc emulsions. To speed deliveries, they are warehoused in strategic areas in the United States and Canada. Feel free to call on our technical service people for any problem concerning the use of PVAc emulsions for adhesives or packaging. For more information on CL-101, write to: Celanese Chemical Company, a Division of Celanese Corporation of America, Dept. 752-D, 180 Madison Avenue, New York 16, N. Y.

Celanese®

Canadian Affiliate: Canadian Chemical Company Limited, Montreal, Toronto, Vancouver.
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Celanese
CHEMICALS

NEWS FROM GOODRICH-GULF

NEW HIGH-DENSITY POLYETHYLENE TO HAVE UNIQUE CHARACTERISTICS

A new type of high-density polyethylene not now manufactured in the U. S. will be produced in a new Goodrich-Gulf plant, scheduled for completion late this year. The product will be the first of a family of polyolefins.

Specific characteristics, including outstanding environmental stress crack and thermal resistance, have been built into the Goodrich-Gulf polyethylene which will be manufactured by a new process based on Ziegler chemistry. This process has been developed during four years of pilot plant operation and is designed to produce ethylene polymers particularly suited for manufacturers of bottles, pipe, wire and cable insulation.

Goodrich-Gulf work on plastic materials has covered the entire range of polyolefins with special emphasis on polymers of ethylene, propylene and butylene. Development laboratory and complete sales service will be provided in conjunction with the new plant.

NEW AMERIPOL 4600 IS EASIER PROCESSING RUBBER

A new, fatty acid emulsified, cold type styrene-butadiene copolymer is now available from Goodrich-Gulf. Called Ameripol 4600, the announcement of its development is being made after a year of extensive field testing, which indicates that it will be ideal for use in shoe soles, floor tile, sponge, white sidewalls, sport shoes and household goods.

Ameripol 4600 is similar to 1502 type polymer except a fatty acid emulsifier is used instead of mixed fatty acid rosin soaps. However, 4600 has some distinct advantages: its Mooney is in the 36-48 range rather than 46-58 and it is lighter in color.

The new polymer was produced primarily to provide rubber processors with an easier processing rubber exhibiting a faster cure rate, higher modulus, and less tack than 1502. With lower viscosity, the polymer can be broken down in drastically less time than usual. The reduced Mooney range also provides less power consumption at the processor's plant. The hardness of 4600 is slightly higher than 1502 for a given cure time.

Exceptional appearance and smooth feel are achieved in these soles for quality dress shoes with Ameripol 4600. In addition, processing costs are reduced.

LOOK AHEAD-NEW SYNTHETIC RUBBERS FOR TRUCK, AIRCRAFT, HEAVY VEHICLE TIRES

Advanced engineering work is underway at Goodrich-Gulf leading toward commercial production of two new synthetic rubbers, Ameripol SN rubber (polyisoprene) discovered by the company in 1954, and Ameripol CB (cis-polybutadiene) rubber, an equally important development.

Ameripol SN, the first man-made rubber having the same molecular structure as natural tree rubber, was first announced by Goodrich-Gulf in 1954. It possesses the physical properties of tree rubber even to tack and stickiness. Pilot plant operation has produced five distinct types in tonnage quantities for large scale testing. This program has demonstrated that Ameripol SN can be substituted pound for pound for natural rubber in the manufacture of truck, bus, aircraft, military, and off-the-road tires.

Ameripol CB rubber has excellent characteristics for minimizing heat build-up, which is a prime cause of the destruction of truck tires and other products. It is a stronger, tougher rubber at high temperatures than any other general purpose synthetic rubber now available.

When these new rubbers are available, it is anticipated that manufacturers of heavy-duty tires can reduce their dependence on tree rubber by 50 to 100 per cent. In addition to attractive physical properties, these new man-made rubbers will offer the major advantages of price stability and a source of supply completely independent of far eastern sources.

CONVEYOR USES WORLD'S LONGEST RUBBER BELT

Ameripol rubber is used in eleven miles of conveyor belting for this limestone and shale conveyor system—including a single flight of belting measuring nearly 12,000 feet, longest ever built. Long length belts help reduce maintenance, labor and equipment costs.

Ameripol is a preferred rubber for the blend used for belting material. It contributes good aging properties, and resistance to wear and weathering.

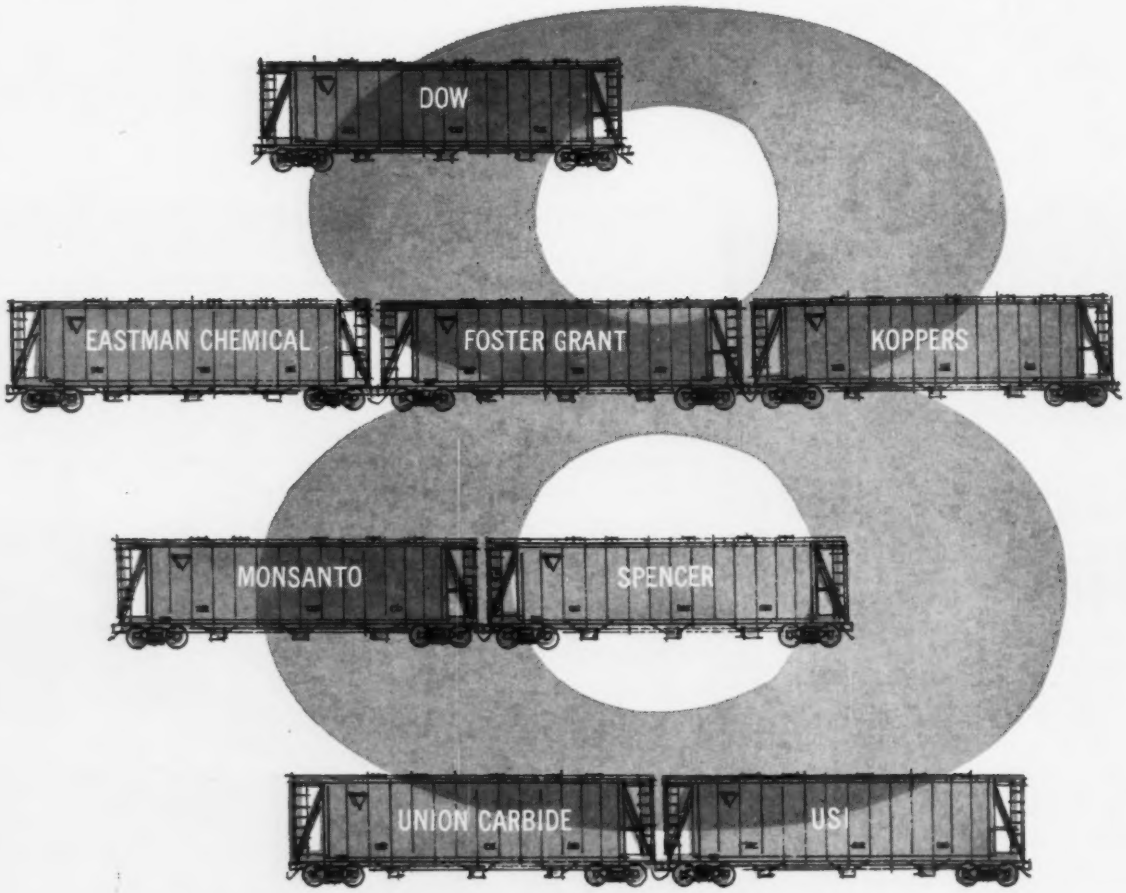
Ameripol
THE PREFERRED RUBBER

SALES SERVICE LABORATORY EXPANDS FACILITIES

This Banbury® Mixer at the Goodrich-Gulf Service Laboratory is typical of a full range of processing equipment which helps us duplicate customer factory operations. Thus, problems can be analyzed thoroughly and sound technical recommendations for different recipes, processing methods, etc., can be made. Laboratory services, when you need them, are available through Goodrich-Gulf Technical Service.

If you want additional information on any of these items, or would like to be on the Goodrich-Gulf technical release mailing list, please write Goodrich-Gulf Chemicals, Inc., 1717 East Ninth Street, Cleveland 14, Ohio.

Goodrich-Gulf Chemicals, Inc.



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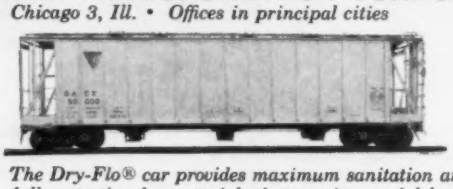


The Dry-Flo® car provides maximum sanitation and full protection for materials that require careful handling.

HE'S IN GREATER DEMAND than were his direct predecessors. Sales manpower needs are highest since '57.

HE'LL BE BETTER PAID. Starting salaries are up 3-5% over those of '59, average $525/month for fledgling salesmen with B.S. degrees.

HE'S A TECHNICAL MAN. Although firms try to balance technical and nontechnical recruits, the trend is toward the man with a chemical or related degree.

Close-up: Chemical Salesman, Class of '60

This week, as the season for recruiting sales trainees from the class of '60 draws to a close, these patterns are evident within the chemical process industries:

- Sales manpower needs are at their highest point since bustling '57. More freshman salesmen will be recruited this year by the large CPI concerns than in any of the past three years.
- Starting salaries are at an all-time high. New salesmen, fresh from school, will be getting as much as $500-550/month if they have a bachelor degree, higher if they have a graduate degree.
- There is renewed emphasis on hiring technically trained men for chemical selling.

These are the salient results of a just-completed CHEMICAL WEEK survey of CPI sales managers, personnel recruitment officials, employment agency directors and college placement officers. Should these patterns develop into full-blown trends in the months ahead, qualified young salesmen will be increasingly difficult to come by, and the cost of adding them to rapidly expanding marketing forces will continue to spiral upward.

Record Needs: One recruiter's comment aptly sums up the situation: "Our needs are up—way up—this year. This may be an even tougher recruiting year than '57. Anyway, it's a great year for the class of '60."

Nearly all companies checked say

that they will seek many new men—most of them recent graduates—to fill slots in expanding marketing organizations.

The larger chemical producers are filling jobs created by growth and expansion during the past year. The business slowdown of two years ago curtailed many expansion projects, put the brakes on sales recruiting last spring.

And many companies reveal that their plans this year call for a manpower "cushion," to compensate for new men who are taken into military service.

One large company that hires promising sales candidates despite their upcoming military obligations notes that nearly 95% of these men would return following their tours of duty. In past years, such returnees amounted to 25 or 30 salesmen annually. But now, the company reports, fewer men are entering the service, almost none return. Countermove: stepped-up recruiting to fill company needs.

Against the Trend: A downward revision of U.S. economic prospects for the remainder of the year is dampening demand for new sales manpower in some quarters. In companies where this is happening, recruiters are still looking for prospects, but they're extending offers cautiously.

These companies are the exceptions. Most CPI concerns are engaged in a highly competitive struggle to win a portion of the '60 crop of sales candidates.

Who's in Demand: As usual, most of the larger chemical companies will get their marketing manpower from college graduating ranks. Reason: these firms prefer to train their salesmen their own way, build a manpower backlog from which management men will ultimately be chosen.

On the other hand, smaller CPI companies often seek experienced men, will wait until they can find a man qualified for a given job.

The time might seem ripe for pirating, but most companies say they have seen little evidence of job-raiding. In fact, many personnel men say the CPI still stands out as having one of the best no-raid records among all industries.

Technical-Degree Talent: Men holding degrees in chemistry and chemical engineering are most in demand, as usual. And there are strong indications that those companies that have employed nontechnically trained men for chemical sales jobs in recent years (*CW, Aug. 10, '57, p. 54*) are charting a new course.

These companies reportedly are not satisfied with the growth potential of the nontechnical graduates. They often develop into excellent line salesmen, but lack the grasp of technical problems needed to qualify for more specialized staff or middle-management positions.

This disadvantage is seen by the nontechnically trained salesmen, too. Many are reported to be leaving companies in which their lack of chemical education has proved a handicap.

This is not to say that the nontechnical men are no longer valuable in many CPI sales jobs. These men are doing good jobs—and doubtless will continue—in such industry segments as plastics molding powder, drugs and pharmaceuticals, heavy organic and inorganic commodities (chlorine, sulfuric acid), specialties and consumer chemical products such as polishes, waxes, automotive chemicals.

But the trend does indicate that, despite heavy manpower demands, companies will be more selective in their use of nontechnical salesmen.

Too Early to Know: CPI sales recruiters will learn how well they have fared in several weeks, when candidates begin to reply to offers. Right now, it's not clear just how close most firms will come to '60 quotas.

Some personnel men, however, report that graduates with technical degrees continue to shun sales or marketing positions, prefer jobs in research or manufacturing.

Many companies recognize that this dissatisfaction with the prospects of a sales career might change after stints in manufacturing and research departments. Thus, most CPI concerns look to those departments for potential sales talent.

And recruiters believe that the "antisales attitude" among new graduates is declining. Until recent years, sales careers had been labeled as "not challenging enough for the very capable student."

Top Dollar: This year's graduating class will feast upon the highest starting sales salaries ever offered by U.S. companies. Athough many of the small and medium-size companies report little rise in starting salaries, most of the larger firms report rises of 3-5% over those of '59. Some companies are offering up to 7-8% over last year's starting salaries to attract qualified men.

Many recruiters are offering the best men far more than they offer the median men—further indication of the intensity of the manpower race. Starting salaries for B.S. graduates are now $490-550/month.

Prospects with master degrees are receiving offers of $600/month or more.

Salary Compression: The intense bidding for top talent is causing concern for the over-all company salary structure.

If, each year, job candidates are offered another 4-5% boost (intended to snag a few more of those who formerly got away), salary structures will inevitably become unbalanced, say salary administrators. And men with a few years' experience will suffer in the squeeze of salary compression.

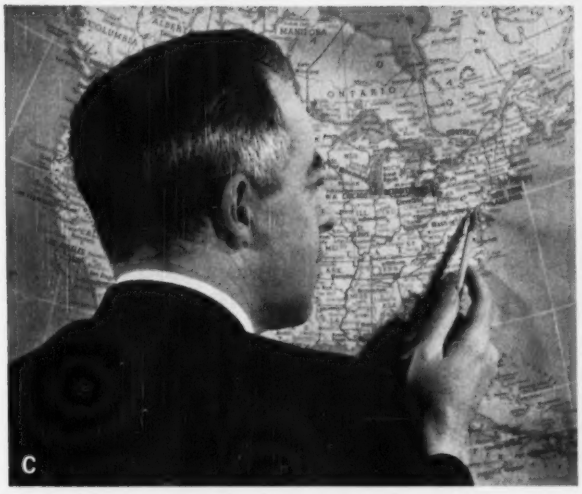
This problem of the salary pinch on experienced personnel is not new. But there is a growing conviction among personnel recruiters and salary administrators that the problem is becoming steadily more serious, needs urgent attention.

Some observers have even predicted that the ultimate outcome of the salary pinch will be a situation in which a novice salesman not long out of school will accept a job in the training program of another company in order to cash in on fast-rising starting salaries. Admittedly, this isn't likely, but it does serve to focus attention on what most recruiters feel is a serious, but perhaps necessary, evil of industrial recruiting.

One proposed solution: attract new candidates with company and career features other than money.

Students themselves rank salary several notches below such job factors as opportunity to learn, experience, chance for advancement, job satisfaction.

Regardless of what measures CPI personnel men adopt to stem the tide of rising salary offers, this much is clear; this year's needs are the industry's highest since the boom of '57. Problems are proportionately severe. Solving them will test the resourcefulness of sales and personnel management.



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C **"It's delivered in nothing flat! My distribution point is just around the corner."** (Allied Chemical plants are located in: Ironton and Southpoint, Ohio; Ashland, Kentucky; Hopewell, Virginia; and Detroit, Michigan. Bulk terminals at strategic points.)

D **"My Allied Chemical Technical Rep seems to know the answer to all my problems . . . and he's just a phone call away!"** (Allied Chemical has been first in ammonia since 1890.)

E **I'm never at a loss for technical data. Allied Chemical sends it by return mail!"** (Write us today.)

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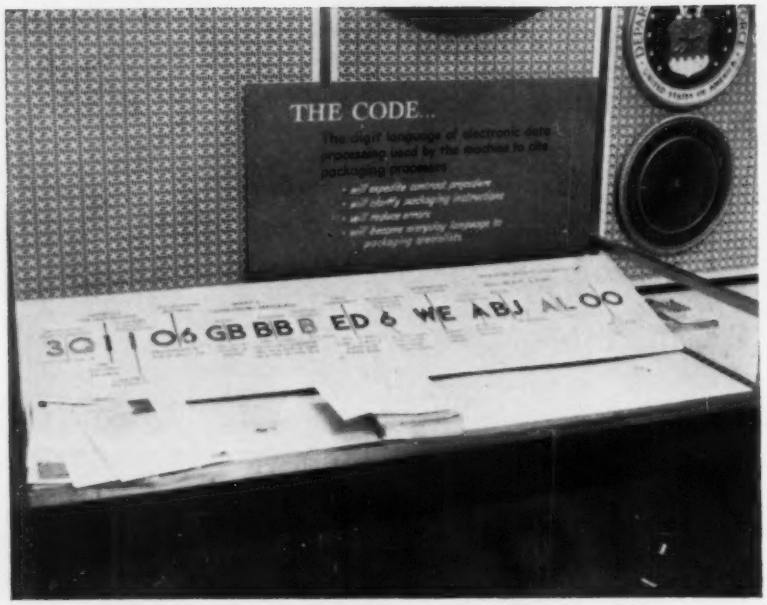


New Defense Dept. code standardizes military packaging specs.

Now: Packaging by the Numbers

This week packaging specialists and military suppliers in the New York metropolitan area got a briefing on the Defense Dept.'s new universal packaging coding system. The code establishes a uniform way to specify packaging requirements for all military services.

The new system—designated MIL-STD-726—is expected to standardize packaging requirements. Essentially, it's "a machine language record of a packaging requirement . . . to provide needed protection for a specific item."

It's designed to reduce lengthy packaging data to a series of letters and numbers, which can be conveniently stored and manipulated by existing electronic data-processing and electric accounting equipment. The system is expected to expedite contract procedures, clarify instructions, minimize errors, cut procurement costs.

Many Digits: Seventeen digits of the 23-digit code number will detail the packaging required to protect nearly 85% of all military supply items. The digits will specify method of preservation, quantity per unit package, cleaning and drying procedure, preservative compound, wrap and cushioning materials, unit container, unit packages per intermediate container, intermediate container, level of protection.

The remaining six digits limit the maximum allowable size of the unit container weight, volume dimensions.

For years, each service procurement agency has specified packaging requirements of its own. This has resulted in considerable confusion for suppliers packaging the same product for more than one agency.

Many Factors: Part of the problem lies in the wide variety of factors to be considered when dealing with military packaging requirements. The various military departments have developed basic packaging-methods specifications and a series of material and container specifications to cover such factors as storage duration, quality of storage, storage temperature, humidity and corrosion resistance of the item, as well as shipping, handling and storage hazards, and mechanical-damage resistance of the item.

A by-product of the code—which will be explained again in seminars May 23-24 at Chicago and May 27 at Cincinnati—will be its effect on nonmilitary packaging. Traditionally, military developments in the areas of distribution, packaging and transportation, as well as in other industry-related areas, have had far-reaching effects on industry practices, have often resulted in industry-wide standardization.

DATA DIGEST

• **Polymer Directory:** Revised 12-page booklet catalogs technical data for over 150 polymers made by Borden. Products included: polyvinyl acetate homopolymer emulsions, copolymer solutions and bead resins; butadiene-styrene emulsions; acrylic emulsions and solutions; polystyrene emulsions; vinyl and vinylidene chloride emulsions; polyvinyl alcohol; sodium polyacrylate thickeners, and methyl acetate solvents; specialty monomers and acrylic rubbers. Polymer properties given: percent solids, viscosity, pH, particle size, percent free monomer, specific gravity, and weight per gallon. Borden Chemical Co. (350 Madison Ave., New York, 17).

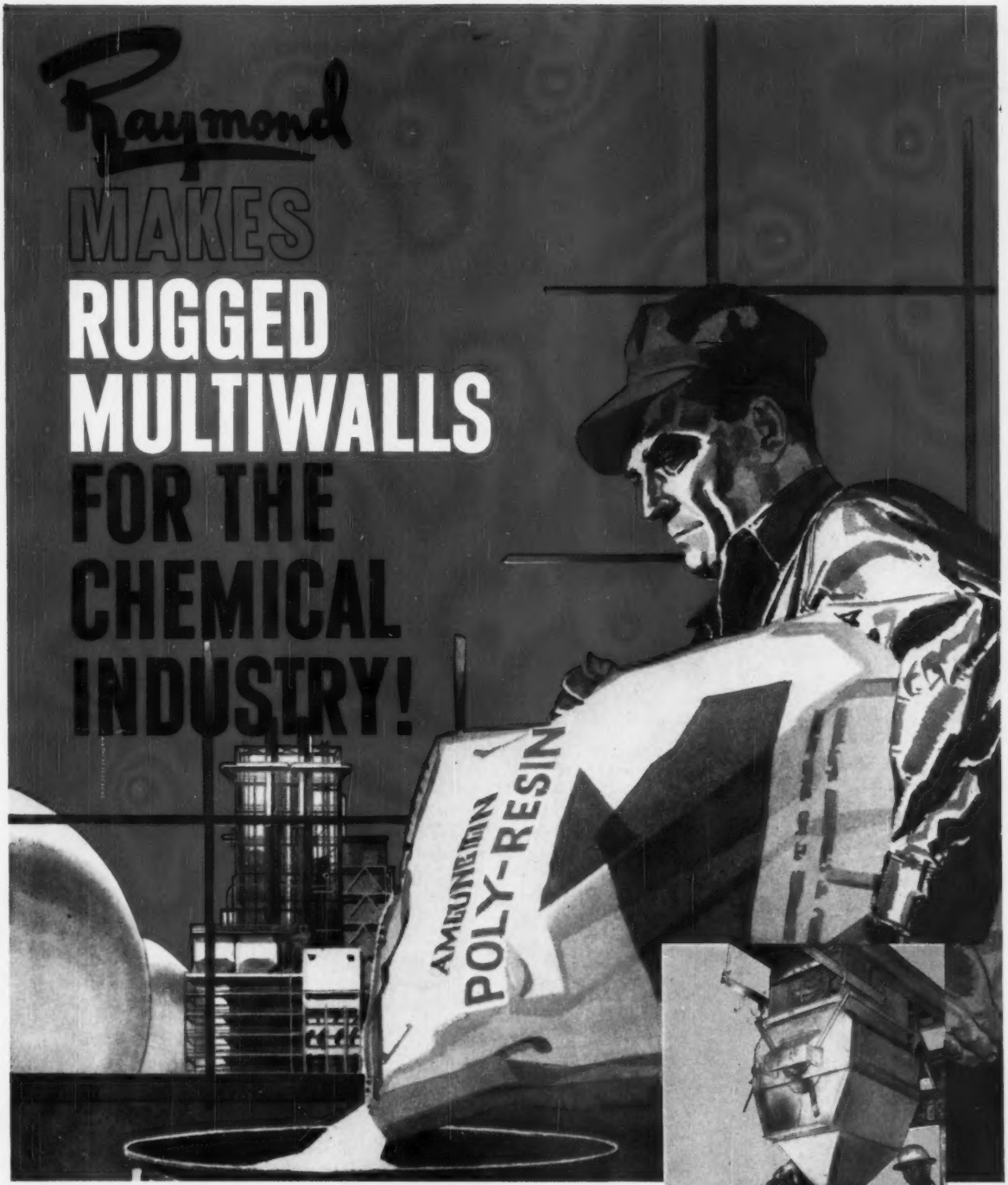
• **Metal Powders:** New 22-page directory provides technical data on metal powders used in most powder metallurgy applications. Among powders included: metallic hydrides, filter powders, coated electrode powders, flame-cutting powders, graphite powders, and all types of ferrous and nonferrous granular metal powders. Metal Powder Producers Assn. (60 East 42nd St., New York 17).

• **Sulfur Chloride Safety Data:** Just-issued chemical safety data booklet (SD-77) presents safe handling procedures for sulfur monochloride and dichloride. Also included: properties, hazards, storage-tank and equipment maintenance, medical and first aid procedure. Cost: 30¢. Manufacturing Chemists Assn. (1825 Connecticut Ave., N.W., Washington 9, D.C.).

• **Epoxy Concrete Adhesives:** Pocket-size handbook describes methods of applying epoxy adhesives to concrete. Subjects included: surface preparation, equipment required, mixing procedures, use of solvents for thinning, and curing methods. International Epoxy Corp. (501 N.E. 33rd St., Ft. Lauderdale, Fla.).

• **Synthetic Lube:** New technical bulletin lists basic properties and application data on Pentalube TP-653-B, a high-temperature synthetic lubricant just qualified under the Air Force's newly issued MIL-9236B specification. Bulletin states that the lubricant has established new standards of stability, lubricity and cleanliness. Heyden Newport Chemical Corp. (342 Madison Ave., New York 17).

Raymond MAKES RUGGED MULTIWALLS FOR THE CHEMICAL INDUSTRY!



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SODIUM SULFITE · STABILIZER 85X · FERROF
ALUMINUM FORMATE · SODIUM CARBOI
DIPHENYL PHOSPHITE · POLYPH
FERRIC PYROPHOSPHATE · HEMISODIUM PHOSPHA
IT PAYS TO SEE VICTOR · MONOAMMONIUM
ALUMINUM METAPHOSPHATE · TRIMAGN

3
IT PAYS TO SEE VICTOR

Phosphates
beef 'em up

These beefs are headin' for the last roundup in tiptop shape. They'll pull down premium prices largely because they've been fed minerals supplied by Victor Stock Food phosphates.

As all good ranchers know, cattle grow bigger, fatten faster, have better bone structure when they get the correct daily ration of essential minerals, calcium, and phosphorus. Since natural feed in many areas lacks proper mineralization, feeds must be fortified. For this, stockmen use Victor calcium phosphates or sodium phosphates.

Maybe it's time you took stock of some of *your* problems... turned 'em over to our technical servicemen. The range of ways they can help with Victor chemicals is as big as all outdoors. No wonder so many experts say, "*It pays to see Victor.*"

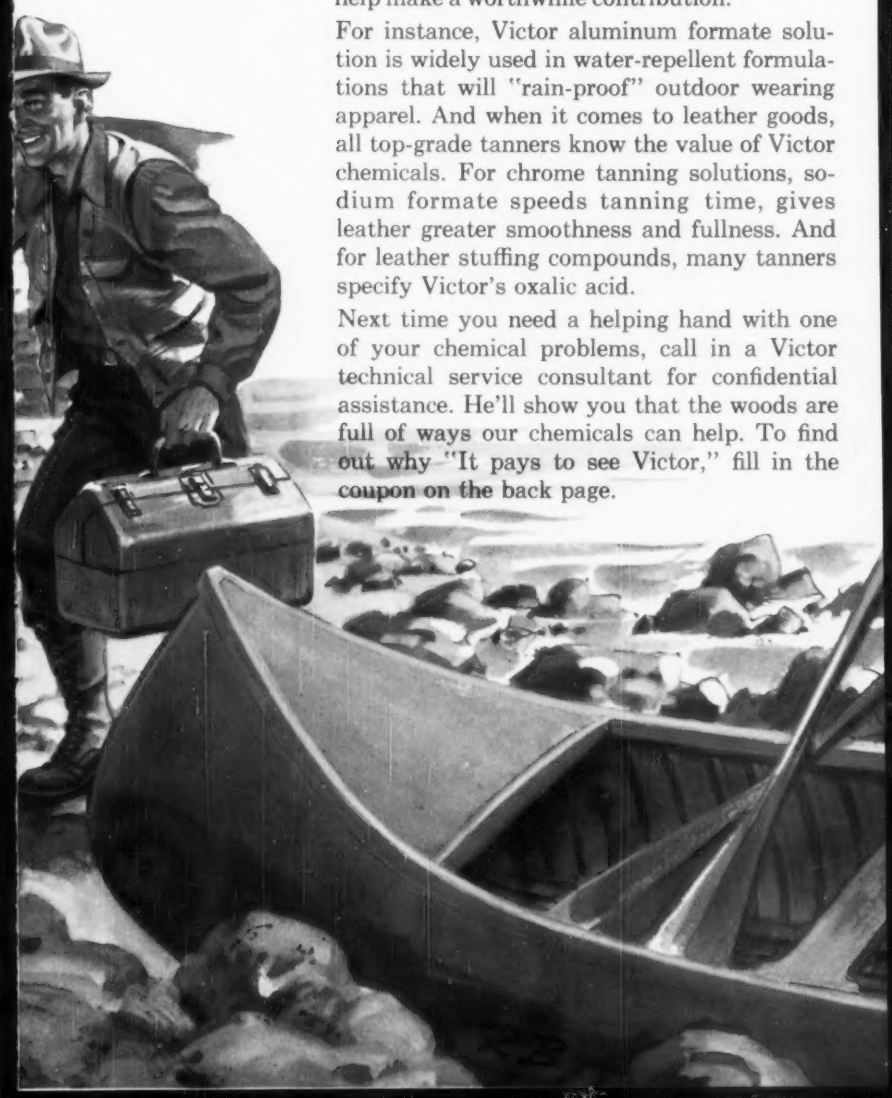
TRIPOLY perks up Pluto

Kids say...and *do*...the darnedest things. Like parking toy pets in the family wash. And though Mom may have other problems on her mind, she knows that this menagerie will come out clean —thanks largely to Victor polyphosphates.

For, as so many soapers know, Victor sodium polyphosphates (both tetra and tripoly) combine their synergistic action with soaps and detergents to assure greater cleansing action, even in the hardest water, prevents iron stains, too!

Our technical people would like to show you how problems have a way of going "down the drain" quickly when Victor chemicals get into the act. For the fastest way to find out why more than 40 industries say, "*It pays to see Victor,*" use the coupon on the back page.

Formates add to the fun



It's great to forget your worries and woes in the wonderful world of woods and water. Personal comfort, of course, adds to the pleasure. It's here that Victor formates and oxalates help make a worthwhile contribution.

For instance, Victor aluminum formate solution is widely used in water-repellent formulations that will "rain-proof" outdoor wearing apparel. And when it comes to leather goods, all top-grade tanners know the value of Victor chemicals. For chrome tanning solutions, sodium formate speeds tanning time, gives leather greater smoothness and fullness. And for leather stuffing compounds, many tanners specify Victor's oxalic acid.

Next time you need a helping hand with one of your chemical problems, call in a Victor technical service consultant for confidential assistance. He'll show you that the woods are full of ways our chemicals can help. To find out why "It pays to see Victor," fill in the coupon on the back page.

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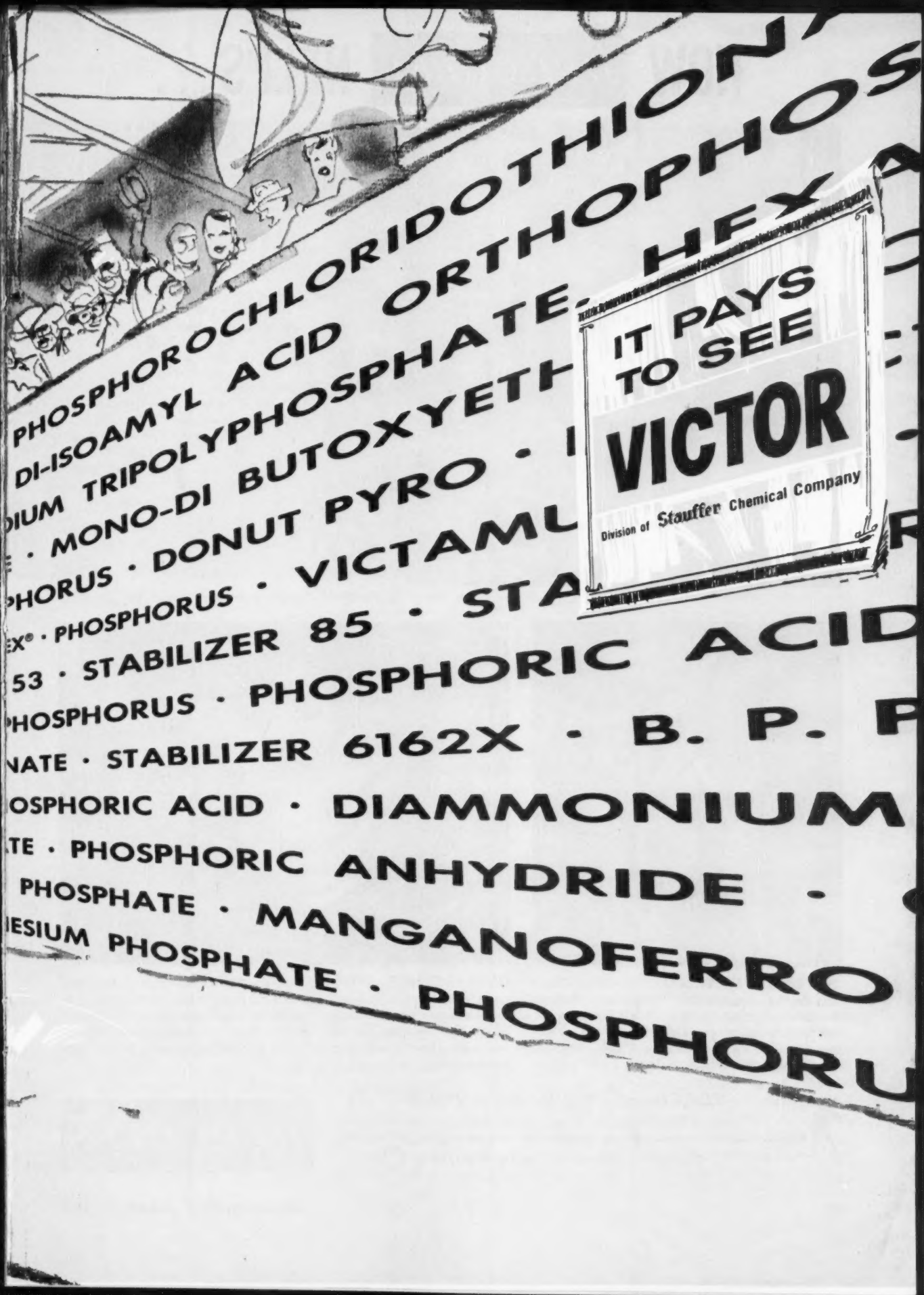
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HOW *HERCULES* HELPS...

KEEP YOU IN THE SWIM—The attractive swimming pool at the exclusive Palm Beach Towers in Florida is among the many kept invitingly colorful through the use of long-lasting swimming pool paints based on Parlon®, Hercules chlorinated natural rubber. An indication of the growing popularity of swimming pools is found in the fact that from 1948 to date private pools have grown in number from 2,500 to more than 170,000. In 1960 alone, 5,000 contractors, builders and distributors will install more than 65,000 new pools. The Parlon-based paint for the Palm Beach Towers is a product of John W. Masury & Son, Inc., Baltimore. Paint contractor for Beach Towers was Henry V. Johnston, Inc., of Lake Worth.

NEW BROOMS SWEEP CLEAN—Milwaukee Dustless Brush Company's new "Speed Sweep" factory brushes, with bristles made of Pro-fax® polypropylene monofilaments, sweep cleaner, faster, and better; resistant to oils, greases, alkalis and acids, they last longer than other brushes under hard use.

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CHEMICAL MATERIALS FOR INDUSTRY

HERCULES

Officials of food company check broccoli shipped at —124 F.

New Market in the Freezer

A combination of plastic foam and liquid nitrogen may soon cause sweeping changes in the transportation and storage of frozen foods. By using liquid nitrogen (at temperatures of —320 F) to supercool food, then using polystyrene and polyurethane foam insulation to maintain these low temperatures, food processors may be able to eliminate the need for mechanical refrigeration in cooling and shipping their products. And in so doing they may also provide a sizable market for makers of plastic foam resins.

To promote liquid-nitrogen cooling, a demonstration has been scheduled for next week in Los Angeles of a compact unit designed to freeze food at rapid rates (it will cool food from 180 F to —5 F in five minutes). The machine, the property of a major food processor, is the first of several on order now with Liquefreeze Co., a division of Isbrandtsen Co., Inc., New York shipping firm. Liquefreeze, working with Willard Morrison, developer of transoceanic shipment of liquid methane, worked out the machine, hopes to license others like it to food processors. The company is also working with rail and truck lines in developing suitable equipment for transporting the supercooled materials. Development of this unit is the prime reason for the new emphasis on the system; although nitrogen freezing has been considered before, its application has been stymied by lack of a suitable initial freeze-down machine.

Liquefreeze grew out of Isbrandtsen's search for a way to transport refrigerated goods on its vessels without using mechanical cooling devices. The company has done some impressive work in methods of shipping frozen food overland — it has moved 61,000 lbs. of food from coast to coast by rail and maintained extremely low temperatures from start (—320 F) to finish (—124 F).

Lots of Foam: If the Isbrandtsen system gains acceptance by the food industry, it could provide large-volume markets for foam resin makers; a boxcar, which uses insulation about 6 in. thick on ends and side, and 8 in. thick on ceilings and floors, takes 1,000-1,500 cu. ft. of foamed material (with density of 1½ lb./cu.ft.). And special containers — measuring about 8x8x8 ft. — are also big users of foam. Those made by companies such as Haskelite Co. (Grand Rapids, Mich.) and Grumman Aircraft each call for around 200 cu. ft. of foam.

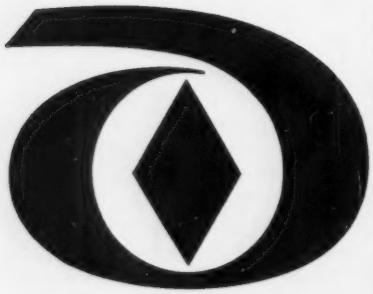
Most of the insulation now being used is polystyrene, but polyurethane is also used. For gasketing, Du Pont's Adiprene liquid urethane rubber has been used almost exclusively. It has also been used as an internal coating for foam. Although foamed-in-place materials would appear to have the inside track as insulating materials, most of the insulation thus far in this application has been the preformed material — it lends itself better to mass production techniques, gives more flexibility in use. Both Haskelite and Grumman Aircraft, however, are working on foamed-in-place techniques for these units.

Nitrogen No Problem: Liquid nitrogen producers, such as Linde Division of Union Carbide Corp. and Air Reduction are hopeful about the future of liquid nitrogen frozen food cooling. There's a fairly assured supply of liquid nitrogen available for quick delivery to food packers — in quantities from 25 liters to tank cars. Long range, there may also be a demand for on-site liquid nitrogen plants, similar to the liquid oxygen units used by steelmakers.

Cost Hurdle: The technical feasibility of liquid nitrogen for frozen food hauling and freezing has been amply demonstrated; that it is economical, has not.

Liquefreeze representatives say that, as a rule-of-thumb, nitrogen-freezing is economically competitive with other systems if a food processor ships at least 10 tons/day on trips of at least three days' duration.

Competitive or not, the use of nitrogen freezing is a development worth watching by makers of foams, adhesive, release agents, coatings and equipment makers. The $2-billion/-year frozen food business is booming now and is headed for still greater growth. It could provide an appetizing market if food processors thaw to the idea of nitrogen freezing.



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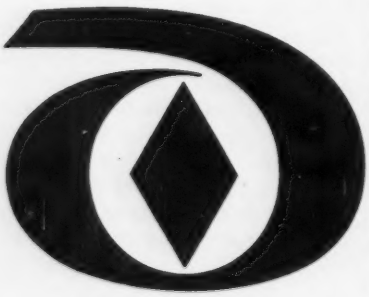

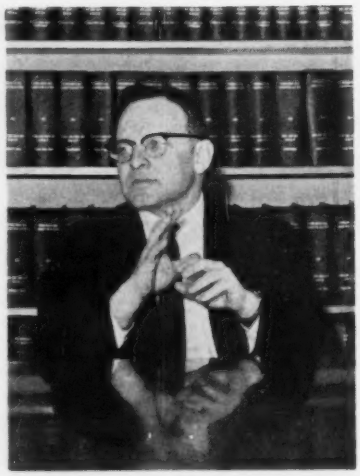

Polyvinyl's Potash: Size is no barrier in tapping overseas markets.

Taking Global View

A U.S. chemical company does not have to be a giant to successfully market its products abroad. That's the conclusion reached by Max Potash, president of Polyvinyl Chemcals (Peabody, Mass.) — a typical small U.S. chemical manufacturer— after an extensive tour of nine European countries.

His findings of what is necessary to successfully sell products in today's fast-changing European market are applicable to a great number of U.S. chemical specialties makers.

Potash's prime motive in going to Europe was the rising number of orders his company was receiving from European concerns that make products aimed at consumer markets. PC manufactures acrylic, styrene, and vinyl acetate emulsion polymers for use in products such as leather and shoe dressings, floor finishes and liquid starches. The rising standard of living there, with a concomitant demand for labor-saving products, made the company decide to more aggressively seek out this market. Although PC has for some time been selling its products abroad, no effort was being made to mold selling efforts into a carefully worked out sales program.

Not So Foreign: After his travels through Great Britain, Ireland, Holland, Belgium, Italy, Germany, Switzerland, Denmark and Sweden, Potash noted particularly the similarities rather than the dissimilarities in marketing in Europe, compared with marketing in the U.S.

He says the correct approach to European companies is not "Here we are, what can we do for you?" but one similar to that used to sell any comparable U.S. customer. Price is not a major consideration, he says, nor is the size of the company supplying the product, nor its country of origin. If a firm has a product that will do the job, European companies will buy it. The reliability and integrity of the supplier is of prime importance.

Potash says he did run up against questions about the capability of a U.S. company to supply customers in Europe and serve them adequately from a long distance. He adds that he could usually get around these objections by pointing out that many of his U.S. customers were as far from him as were his European customers. Also worth stressing, he says, is the wide differences in climatic conditions, marketing techniques, and manufacturing processes that exist in the U.S. As far as the technical service is concerned, he found it helpful to point out to potential European customers the fact that a phone call to his company from Europe was often less expensive than a plant visit to some of his customers in nearby Boston.

Make a List: In presenting his case to his existing and potential customers, Potash found it invaluable to have handy a list of basic foreign technical phrases that related to his own product field. In Germany, for example, words like "wasserfastlichkeit" (water-resistance) and "schlipfwiderstand" (slip-resistance) kept recurring. And knowledge of these made conversations much smoother. He also advises a good grounding in prepositions, found it extremely important to have these at his fingertips. Without both sides knowing these, he says, you may often get a nod — but you're not getting understanding, you're getting courtesy.

Many Germans speak English fluently, but in the smaller towns this is not always the case. Potash feels that it would be worthwhile for any U.S. manufacturer to take a quick course in any of the languages he would be using in Europe. An exception to this, he says, are the Scandinavian countries, where a U.S.

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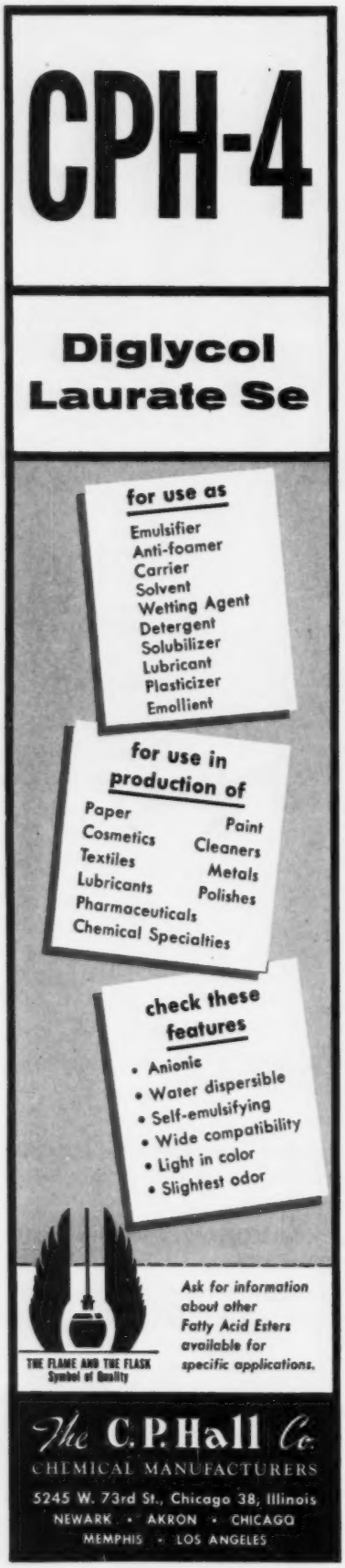

visitor is not expected to know the language.

In all of his plant visits Potash was accompanied by his local agent or sales representative. Having him there made it easier to follow up on any agreements or arrangements made.

Author: The fact that he was the president of his company, says Potash, did not have as much weight with the companies abroad as the fact that he had authored several papers appearing in European journals. This gained him a measure of respect, he says, far greater than he would get as an author in the U.S.. By making serious contribution to the journals of foreign countries, Potash feels, any U.S. chemical maker can greatly enhance his sales effort abroad.

He found a surprisingly small population in some of the countries he visited—often amounting to a market approximately the size of St. Louis. This, he thinks, can be an advantage to the small U.S. chemical company. For the large U.S. manufacturer it would be necessary to get almost 100% of the business in a country of, say, 7 million to make it worth exploiting.

Be a Historian: An asset in selling a product abroad, says Potash, is the ability to trace the use of that product in U.S. markets. Because of the "Common Market" and the growing prosperity of many European countries, factors that didn't exist before in Europe are now coming into play. For instance, though many companies in Europe still favor paste floor waxes, their managements are alert to the rapid acceptance of liquid finishes in the U.S., can use U.S. companies' experiences in marketing such products.

Potash thinks that any U.S. chemical company, regardless of size, will get a fair hearing abroad — from the foreign manufacturer as well as from subsidiaries of U.S. companies (the latter, he found, had a surprising degree of autonomy).

Potash planned to make four visits per day, but he says that three would be more practical. Two weeks' notice, he found, was generally satisfactory in setting up his calls.

Asked what changes he'd make on his next visit to his European customers, Potash says he'll spend more time on language, set up a less strenuous schedule—and bone up on his products' pedigree.

PRODUCTS

Cotton Insecticide: Stauffer Chemical Co. (New York) is marketing several cotton insecticides based on Strobane (chemically, a mixture of chlorinated terpenes with about 66% chlorine). It's said to be highly effective against bollworm, boll weevil, cutworms, grasshoppers and a variety of other insects. Stauffer is offering several formulations: Strobane 6 lb./-gal. emulsifiable concentrate; Strobane 20 Dust; Strobane-DDT 4, 2 lb./gal. emulsifiable concentrate. Heyden Newport Chemical Corp. supplies the Strobane to Stauffer for formulation.

•

Colgate's First Pharmaceutical: Colgate-Palmolive's recently established pharmaceutical division is test marketing its first product, Diar-Aids, in the Midwest and South. It's intended for relief of simple diarrhea. Price: 98¢ for 16 tablets.

•

Chelating Cleaner: Enthone, Inc. (442 Elm St., New Haven, Conn.), is marketing Cleaner 808, an alkaline electrocleaner for steel. Its chelating action is said to make possible the removal of smut, light rust, oxides, and light welding scale. The powdered product is dissolved in water at concentrations of 8 to 10 oz./gal.

•

Insulating Varnish: Melpar, Inc. (3000 Arlington Blvd., Falls Church Va.), has developed a silicone-base varnish to be used as a protective, insulating coating for electronic components. Melvar A-100 is said to reduce moisture absorption, can be applied by dipping, brushing or spraying, without obliterating component markings.

•

Sours and Starches: Cowles Chemical Co. (7016 Euclid Ave., Cleveland) is expanding its line of commercial laundry products with the addition of sours and starches. The sours will be tradenamed Neubrite (fluorescent), Neusol (mothproofing), Fesolv (rust removing), and Neulin (economy). The starch line includes thick boiling, thin boiling, dry to the wheel, and economy types.

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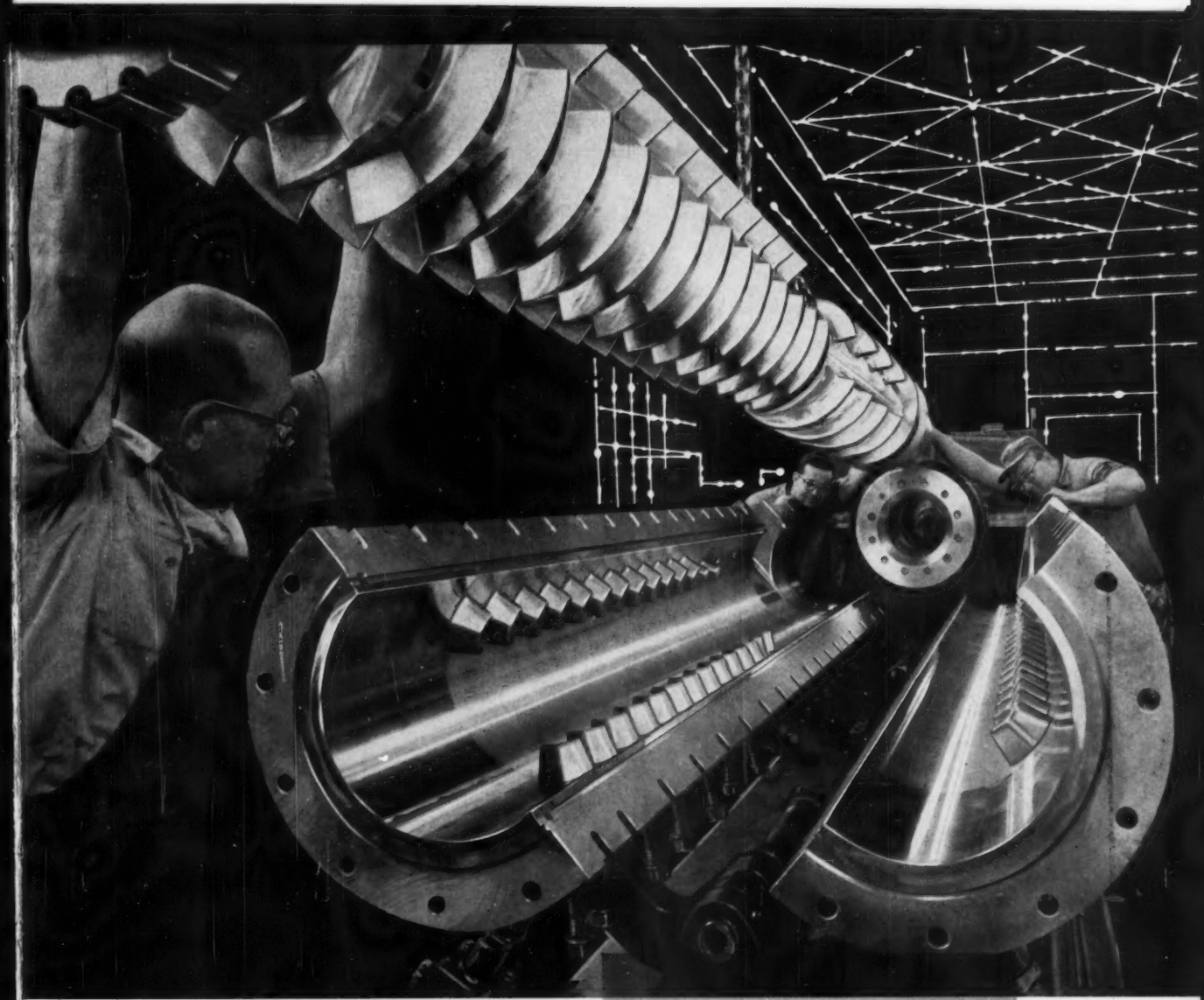
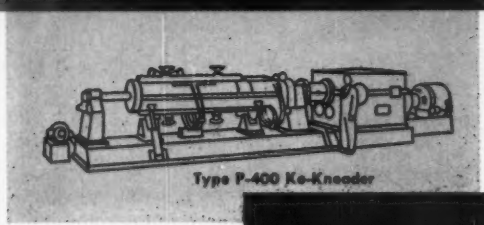
Paint Emulsion: A microparticle vinyl acetate copolymer emulsion specially suitable for coating freshly ap-





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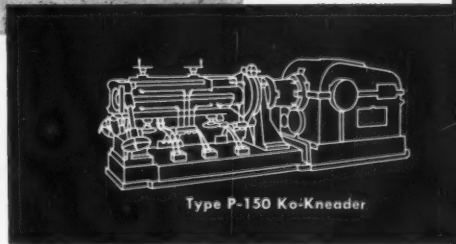

B-P Ko-Kneaders are now mixing a wide variety of products such as plastics, carbon electrodes, food specialties, floor tile, solid rocket propellant fuels and many others. From this experience, proper recommendations can be made for your operation. However, if a new mixing problem is involved, test demonstrations can be arranged in the Baker Perkins Laboratory. Write today for engineering manual K-57 or contact your nearest Baker Perkins sales engineer.

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plied plaster, is being marketed by Dewey and Almy Chemical Division of W. R. Grace & Co. The emulsion, tradenamed Everflex MF, is said to have a particle size as small as any vinyl emulsion now being marketed, provides a high-gloss finish.

•

Urethane Adhesive: A two-part adhesive with high resistance to oils and solvents is being marketed by B. B. Chemical Co. (784 Memorial Dr., Cambridge, Mass.). It's called Bostik 7070, is colorless, cures at room temperature, is recommended for bonding urethane sponge and urethane rubber where resistance to washing and drycleaning is required.

•

Fertilizer-Soil Builder: Potlatch Forests, Inc. (Lewiston, Ida.), is marketing a combination fertilizer, mulch and soil builder tradenamed Garden-Lawn Food. It's made of tree bark by a process that involves heating urea, phosphoric acid and cellulose, and combining them with the natural cellulose contained in the bark.

•

Epoxy Patching Compound: A. C. Horn, division of Sun Chemical Corp. (New York), is the latest to offer an epoxy patching compound. The newcomer, called Thiopoxy 60, is available in grey or red, in 1½-, 2- and 10-gal. units, contains premeasured base and catalyst.

•

Mold Release Agents: New mold release agents, which are said to be effective for all types of elastomeric polyurethanes and polyurethane foams, are being offered by North Shore Laboratories (P.O. Box 568, Salem, Mass.). One of the new series, tradenamed UP-T3, is said to be especially effective in removing polyester- and polyether-type urethane foams from kraft paper. Price of a 6-oz. aerosol can is about $2.

•

Odorless Shoe Polish: Esquire Shoe Care Products (Brooklyn, N.Y.) has introduced what it calls a stainless and odorless high-gloss cream polish tradenamed Lord Esquire. The new line of polish comes in six colors —black, brown, tan, neutral, charcoal brown and oxblood. It's marketed in a 2-oz. jar. Price: 75¢.

•

Water-Soluble Resin: Union Carbide Chemicals Co. is offering commercial quantities of its quick-dissolving water-soluble resin, Cellosize hydroxyethyl cellulose QP-4400. The nonionic thickener can be stirred into water without agglomeration, dissolves almost as easily as sugar, according to UCC. Price: around 89¢/-lb. in quantities of 2,000 lbs. and up.

•

Car Kit: Bissell, Inc. (Grand Rapids, Mich.), is aiming for the do-it-yourself market with its Car Master Kit, containing an auto interior shampoo and applicator. The product is recommended for cleaning leather and plastic seats, floors, door panels and convertible tops.

•

Dye Addition: Carbic - Hoechst Corp. (New York), distributor for Farbwerke Hoechst AG. (West Germany), has added seven new dyes to its Remazol series of vinyl sulfone reactive dyes.

•

Aerosol Seal: Spra-Lok Corp., a subsidiary of Dupli-Color Products Co., Inc. (2440 South Michigan Ave., Chicago), has brought out its Spra-Lok locking device to be used with all aerosol caps to prevent content spillage. A silver foil label covers an opening in each cap; the consumer inserts a key to release the cap. The cap may be relocked after use. Advantage of tamperproof seal: safer merchandising in stores where aerosols are subject to handling, especially by children.

•

Aluminum Polish: The Anton Co. (55 Front St., New York) is marketing Met-All polish for aluminum siding, store fronts, trailers, boats, airplanes, etc. The polish is also suggested for such metals as copper, brass and chrome and other metals. It is claimed to leave a long-lasting salt-spray-resistant finish. Met-All is available in 4-oz. tubes, 2-lb. cans, and in larger quantities for industrial use.

•

Dye Lineup: The Dyestuffs Division of Geigy Chemical Corp. (Ardsley, N.Y.) has made available its new Reactone line of highly concentrated reactive dyes designed for printing on cotton and regenerated cellulose. The dyes can be used to produce a wide range of shades of all depths, can be steam- or heat-fixed, and formulations are said to be simple.

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Automation Pays Off in the Pilot Plant

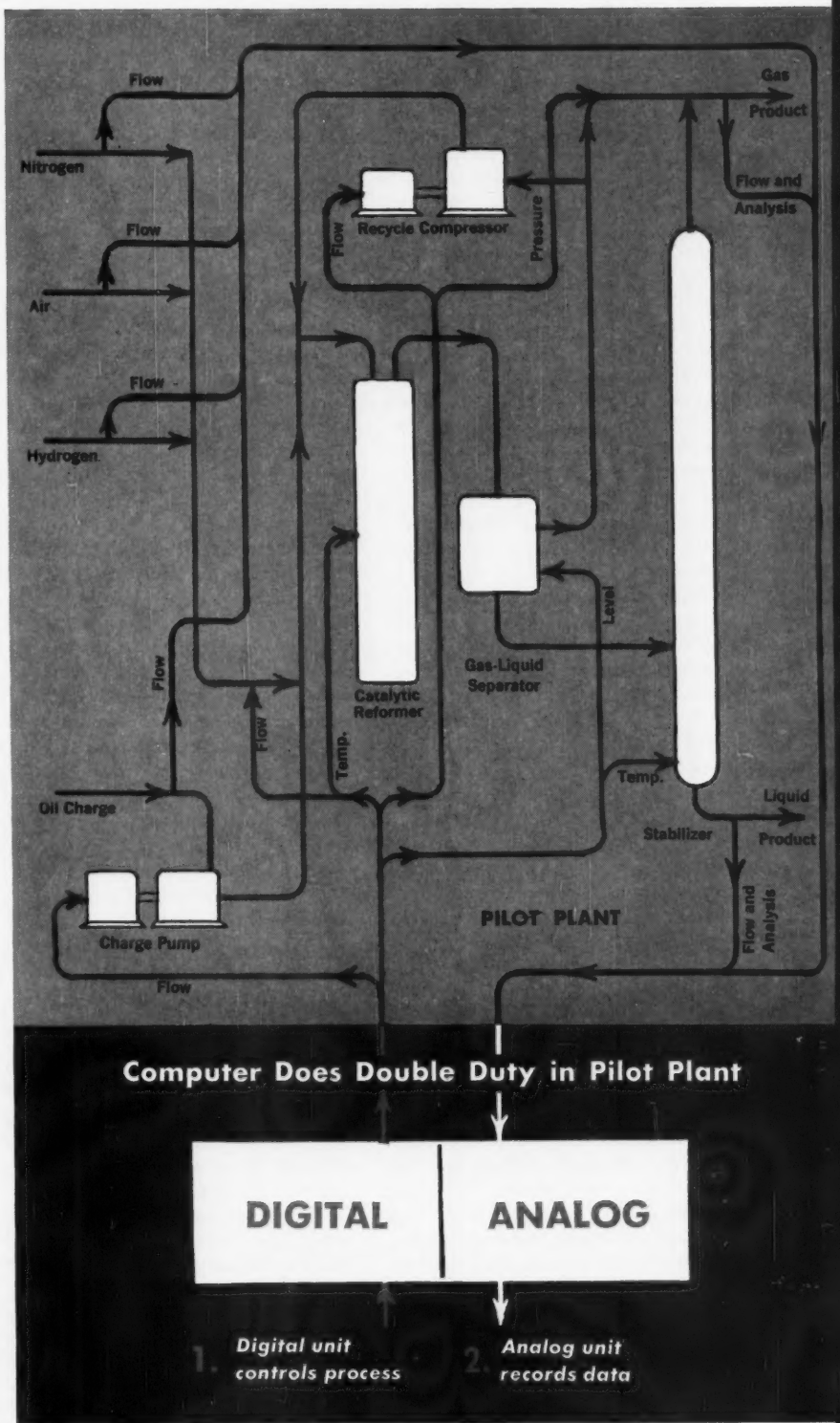
The chemical process industries got a close look last week at Esso's much-touted computer-controlled pilot plant. The unit, in California since its construction in '58, was installed at Esso's Florham Park, N.J., laboratory last month and is currently being checked out. A pacesetter in the field of automatic pilot-plant control, it will be put into regular service within the next few weeks.

Details on just how useful the computer pilot system is came out in recent weeks at the second Symposium of Pilot Plant Automation in Los Angeles, and at a meeting of the Instrument Society of America in Rochester, N.Y. G. Balekjian of Consolidated System Corp. (Monrovia, Calif.), with E. C. Boycks and C. K. Hines of Esso, described the Esso computer-controlled unit. Other talks gave an economic setting against which the new unit could be examined.

Throughout both meetings, three recurring credos could be noted: (1) pilot plants must be regarded as data-producing rather than materials-producing installations, (2) the time necessary to get the required data is a prime factor (in some instances, pilot-plant downtime can be charged as lost production time for the future plant), and (3) pilot-plant instrumentation cannot be judged by the economic standards used for producing plants; current economics indicate that computer-controlled pilot plants are easier to justify.

At the ISA meeting, T. W. Van Hoosear of Shell Development (Emeryville, Calif.) discussed pilot-plant instrumentation on the broad terms of economic justification—defining pilot functions, the roles of management, operating and instrument personnel, the roles of the instruments themselves. His conclusions dovetail with the data presented by Balekjian, Boycks and Hines on the Esso unit.

Automatic Data: In examining the function of a pilot plant, all concerned agree the aim is to produce the engineering data necessary for plant design. Although operating temperatures, pressures, and conversion efficiencies can be developed in the



laboratory, pilot plants are necessary for exploring corrosion, studying trace impurities that may build up in recycle streams, measuring catalyst life and defining limits of operating control.

A unit serving these purposes need not necessarily be a replica of the eventual commercial unit, but rather is a unique chemical process plant employing pumps, reactors, distillation columns, etc., and built specifically for a particular operation.

Whenever a new product is to be made, however, the pilot plant may be constructed on a larger scale and used to develop a market after the engineering data has been obtained.

The extent of the instrumentation in such a unit is decided jointly by management, operators and the instrument engineers. Management, which regards the plant as a tool for obtaining necessary data in minimum time, balances instrument cost against speed and accuracy. The operators think of the instruments as tools that let them keep the plant onstream and safe. And the instrument engineers consider first the reliability of the instruments; they know that any instrument that fails to operate properly on the pilot plant is unlikely to get a fair trial subsequently on the commercial plant.

Working together, these men consider the unit's instrumentation from several aspects. Manual control may be useful if the unit is (1) compact, (2) relatively simple, (3) has narrow operating limits, (4) stable. Otherwise, automatic controls are necessary. Yet, even a manually operated plant carries more instruments than its commercial big brother, since it is a short-lived data producer (pilot plants are normally dismantled after six months' or a year's operation).

When automatic instruments are used, cost is balanced against possible feedstock savings, use of less skilled help, and time saved. Since they are used repeatedly on various pilot units, it is difficult to put definite costs on instruments. Frequently, feedstock savings alone can justify more-than-planned instruments, particularly when a new product is under study and the only feed available comes as a result of expensive laboratory-scale preparations.

When time is the primary factor, delay in termination of the project is sometimes balanced against the cost of equivalent downtime for the proposed commercial-scale plant. Then, the cost of special instruments—data loggers, electronic controllers, fast scanners, and computers, etc.—is considered.

Pilot Computers: Now, chemical management has three operating plants to compare results with: Esso's pilot plant, Goodrich Chemical's vinyl chloride plant (*CW, March 5, p. 35*), and Phillips Petroleum's ethylene plant. The last two are commercial-scale plants; thus, the Esso unit—a reforming pilot plant—is the only completely computer-controlled pilot project.

In general, pilot plants for reforming processes represent a special case in that they are not dismantled at the end of a run. Reformer operations vary considerably with changes in feedstock or catalyst, and it is almost always necessary to pilot a new feedstock or catalyst. This helps justify Esso's move.

In the process section of its unit are charge pump, feed heater, one Powerformer reactor, a separation pot, and a stabilizer. The plant is designed to pilot both the reforming of different oil feeds with different catalysts and the regeneration of the catalysts after a reforming run. It is completely housed in one air-conditioned cabinet protected against explosive mixtures and fire. And the entire unit is under the direct control of an LGP-30 digital computer. A stored operating program, including set points and on-off special controls for special tests, provides the proper sequence of operations on a series run.

In designing the unit, sensing instruments were of crucial importance. Accuracy, type of output signal, desired range of control, and—most important—compatibility with the operator-computer were factors governing choice. Typical of instruments chosen were long capillary tubes for flow measurement, a precision-weighed tube for liquid product measurement, and a chromatographic analyzer.

These instruments were incorporated into control loops whose speed was adapted to the computer program (control loop here means the sensing instrument; the controller, which resets according to a computer signal; and the regulator, which operates a valve to bring conditions to the controlled point).

In the pilot reformer, there are eight of these loops: (1) feed gas flow, (2) recycle gas flow, (3) liquid feed rate, (4) reactor pressure, (5) preheater pressure, (6) preheater temperature, (7) reactor temperature, and (8) stabilizer temperature. All of these are controlled simultaneously by the computer.

Previous tests show that Esso can recover cost ($250,000) of its unit within a month. With such a fast payoff, it seems plain that other companies will soon be installing computers in similar pilot plants.

PROCESSES

Tetrafluoroethylene: Farbwerke Hoechst AG. (Frankfurt, Germany) has added a new twist to making tetrafluoroethylene (a raw material for polytetrafluoroethylene polymers). Key: superheated steam. Normally, tetrafluoroethylene is made by reacting chlorodifluoromethane in an oxy-hydrogen blowpipe. Using this process, Farbwerke Hoechst adds not more than 50% superheated steam (1600 F) by volume. Reaction time is 0.1-0.4 seconds. Yields are claimed to be over 90%, instead of 25-30% reported for standard procedures.

•

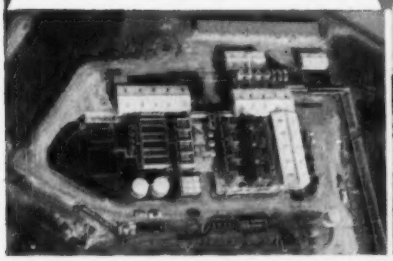
Cheaper Hydrazine: Farbenfabriken Bayer AG. (Leverkusen, Germany) has patented a process for producing hydrazine hydrate directly from acetone solutions, bypassing the hydrazine sulfate formation step of the standard route. Key to the new process is a liquid-liquid extraction with 35% caustic soda at near 212 F. Hydrazine, resulting from the ammonia-chlorine-sodium hydroxide reaction of the Raschig process, is purified by distillation with acetone. However, the hydrazine product contains dimethylketazine, which is practically impossible to separate by distillation.

In the new German process these are separated by mixing them with the caustic soda and letting the mixture settle into two liquid layers. The hydrazine is separated in the hydroxide layer, and can then easily be distilled off as hydrazine hydrate. The caustic soda, concentrated to a 50% solution in the process, is diluted again and recycled. The new process thus saves acids and alkalis normally consumed in the formation of hydrazine sulfate.

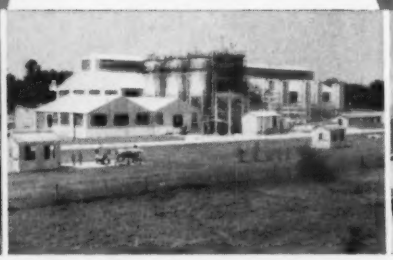
SULPHUR

6 POINTS OF DEPARTURE

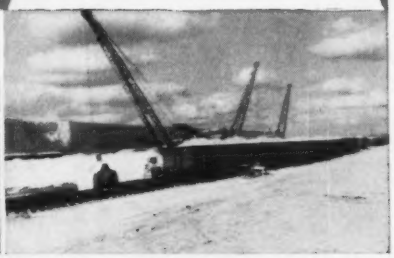
FANNETT, TEXAS



MOSS BLUFF, TEXAS

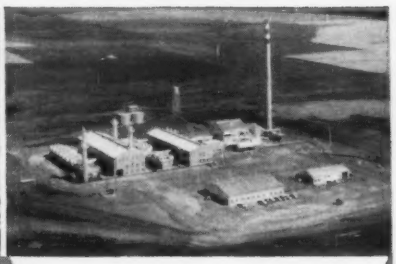


NEWGULF, TEXAS



SPINDLETOP, TEXAS

WORLAND, WYOMING



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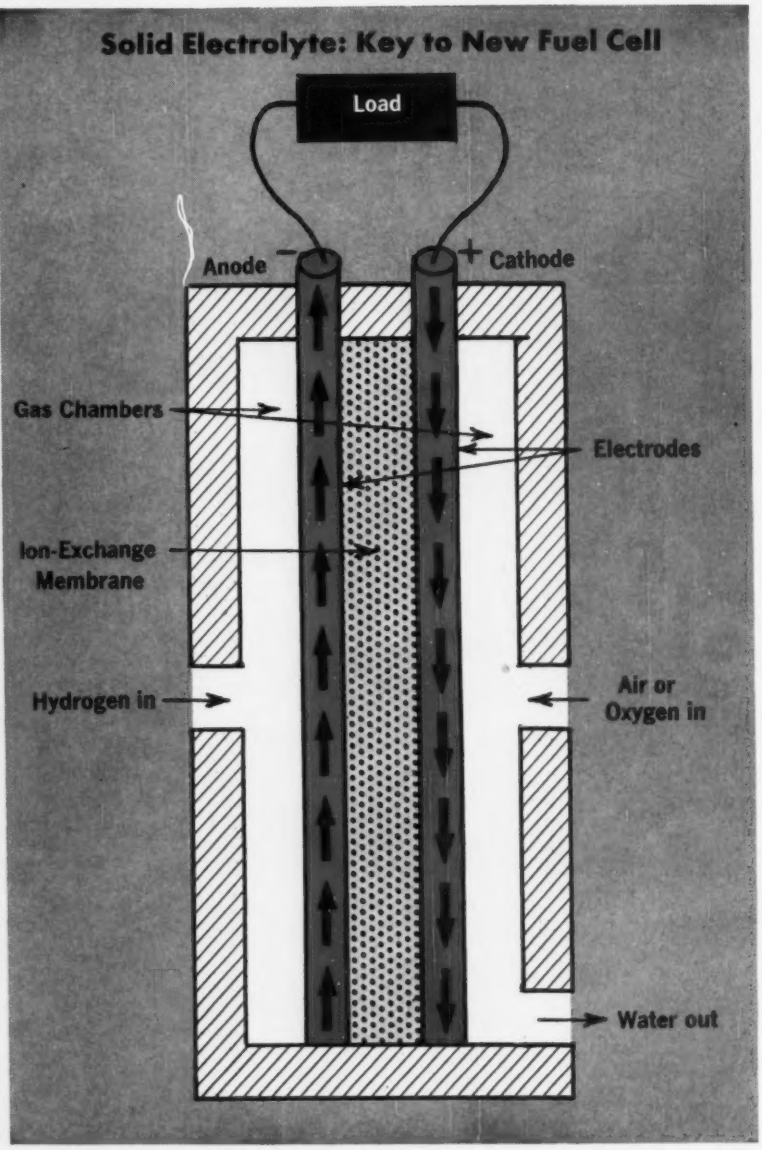
Property Data	
Chemical Formula	CH_3Cl
Molecular Weight	50.491
Specific Gravity	
Liquid—23.7°C/4°	1.00
20°C/4°	.92
Gas 0°C, 1 atmos.	1.74
Boiling Point °C, 760 mm.	—23.76
°F, 760 mm.	—10.76
Refractive Index, n 20°/D	
Liquid—23.7°C	1.3712
Gas 25°C	1.000703
Solubility (in cc.) of Methyl Chloride Gas in 100 cc. of solvent (20°C, 760 mm)	
Water	303
Benzene	4723
Carbon Tetrachloride	3756
Glacial Acetic Acid	3679
Ethanol	3740

ANSUL CHEMICAL COMPANY • MARINETTE, WISCONSIN



New Entry in Fuel-Cell Race

General Electric Co. moved up into the pack of front-running contenders in the fuel-cell race this week. The company's Aircraft Accessory Turbine Department is currently developing a 30-lb., portable unit powered by ion-exchange fuel cells, expects to deliver first units for military evaluation in May.

Goal of GE's development program is a fuel-cell power source that can be mass produced as off-the-shelf equipment for military applications. The device being readied for testing is designed to deliver 200 watts of 24-volt direct current for 14 hours on a single 6-lb. canister of fuel. This 30-lb. package equals the output of a 55-lb. engine generator or 80 lbs. of batteries.

Chemical Keys: The heart of GE's fuel cell is its electrolyte — a plastic, ion-exchange membrane. This feature avoids problems of simultaneous triple contact — between gaseous fuel, liquid electrolyte and solid electrodes — encountered in liquid or molten-salt electrolyte systems. In the ion-

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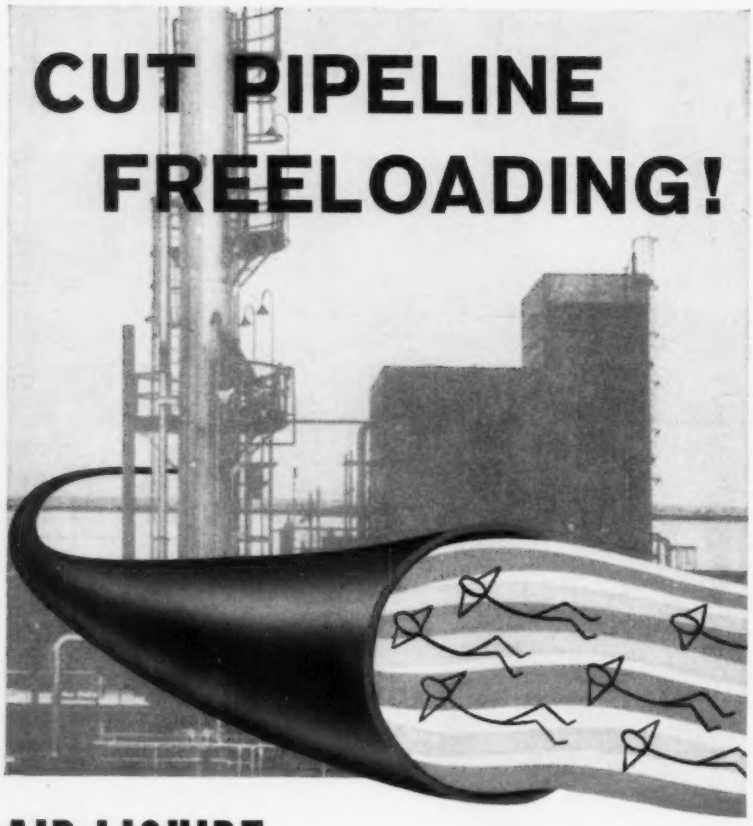

AIR LIQUIDE eliminates "dead head" gas
by low-temperature separation

Here's the way to rid pipelines of unwanted nitrogen, upgrade natural gas and make profits on superfluous yet valuable gases. *Install an American Air Liquide low-temperature gas separation plant*, economical to operate and requiring minimum of attention.

Many natural gas pipelines are carrying "dead head" nitrogen that builds up compression, increases transmission costs and reduces pipeline payload. This nitrogen is removed — at pipeline pressure — by the American Air Liquid process.

At the same time that your natural gas is upgraded, unwanted gases are removed — yielding further profit instead of going to waste as inerts, flue gases or engine exhausts along with a loss of valuable heat. To quote only one example, the extraction of helium offers considerable direct profit from this efficient, economical process.

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exchange cell, the membrane separates the electrodes and the two current-producing reactions. On the anode side, hydrogen fuel is ionized to supply electrons to an external electrical load and hydrogen ions that migrate through the membrane. On the cathode side, oxygen from the air reacts with electrons returning from the external circuit and with the hydrogen ions to form water.

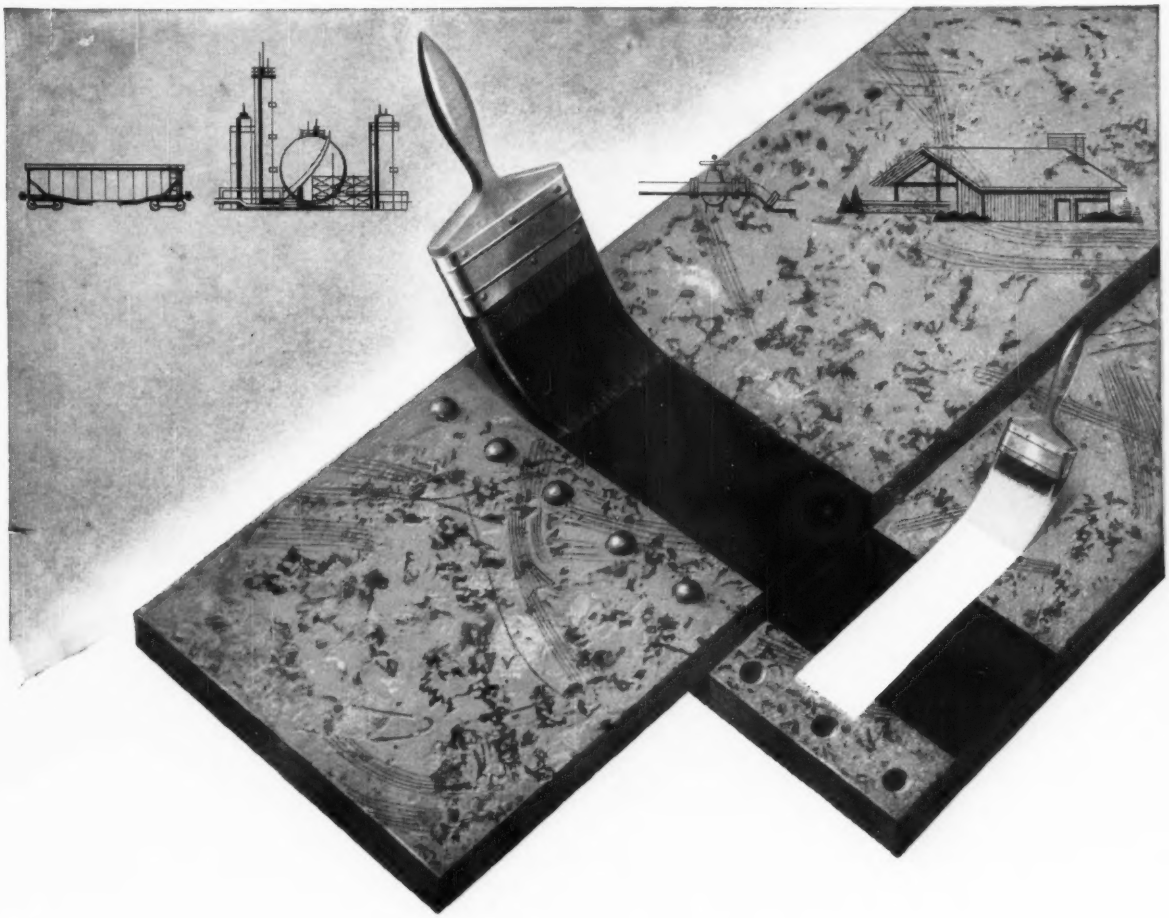
To simplify the problem of storing and transporting the hydrogen fuel, GE settled on hermetically sealed canisters of metal hydride that plug into the power pack. In this form, 72 lbs. of hydride fuel yields the electrical power equivalent of a half-ton of charged storage batteries.

While the military is concerned more with the compactness, portability and lack of detectable operating noise than with cost of fuel-cell power, GE points out that the efficiency of the system compares favorably to other types of generators. Compared on the common basis of thermal efficiency (i.e., input heat energy in Btu./lb. vs. output electrical energy in watts), fuel cells boast a practical attainable efficiency of 60-70%, compared with about 40% for modern steam equipment or 25-35% for gasoline and diesel engines.

Automotive Outlook: Several major automobile companies are also eyeing the fuel cells' potential as an automotive power source, but are generally agreed that this application is still many years away. C. R. Lewis, chief of Chrysler Corp.'s fuel-cell research program, points up several drawbacks:

- Present cells are too large and too heavy for automotive installation, by as much as a factor of 4.
- Cells sufficiently large to power a car now require high pressure and high temperature (930-1000 F), which necessitates a long warm-up period.
- Fuel cells are not sufficiently reliable to get by on the rather haphazard maintenance provided by the average private car owner.

On the plus side of the balance sheet, even the cumbersome high-temperature systems produce electricity at about 2¢/kwh., which compares favorably with gasoline costs. And if today's internal combustion engines could match the fuel cell's top efficiency, cars could get more than 50 miles per gallon of gas.



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IN CANADA: Chemical Division, Shell Oil Company of Canada, Limited, Toronto

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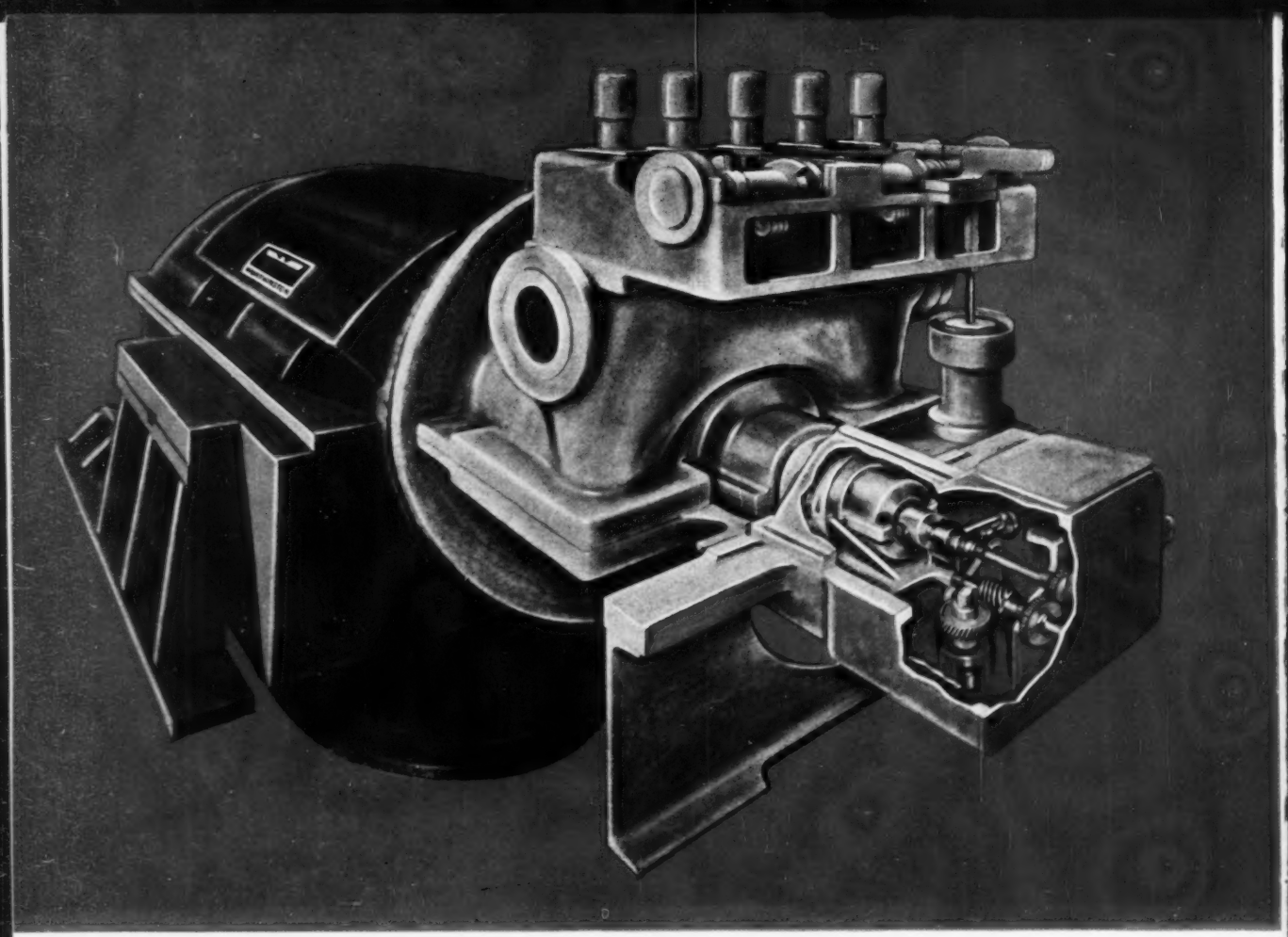

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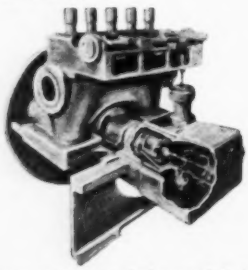
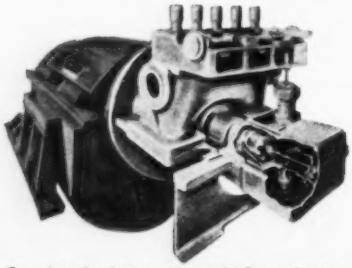


2. Add a high-pressure steam end of proved design with cam operated automatic nozzle control valves.



3. Complete the design with a multi-flow exhaust end.

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WORTHINGTON

Technology
Newsletter

CHEMICAL WEEK
April 30, 1960

A new tetramethyl lead (TML) additive—trademarked "Methyl"—will be used in all Standard Oil Company of California gasoline beginning this week. Socal's various grades will contain blends of TML and conventional tetraethyl lead (TEL) to yield the same total lead content (2.06 ml. of TML is equivalent to the 3 ml. of TEL commonly added to each gallon of gasoline). High-test brands will contain only small amounts of TML; middle grades will use a larger percentage.

California Research, corporate R&D arm of Standard of California, has been testing TML for more than 10 years, first with experimental test quantities supplied by Du Pont, more recently with larger quantities from Ethyl Corp. Cal Research has applied for patents on the application of TML; Ethyl owns the manufacturing know-how, will supply TML to other gasoline producers after increased capacity is available and licensing of pending patents has been settled. At present, Standard of California is taking Ethyl's entire output. Initially, TML will cost refiners more than TEL—but the differential is expected to decrease as capacity climbs.

Tests indicate that TML is more effective than TEL—especially in the newer high-aromatic-content gasolines. Nationwide use of TML reportedly would boost the road octane rating of average premium-grade gasolines by at least one number, at a saving of more than $30 million over other methods of octane rating improvement. Market predictions: in two years, all European gasoline will contain TML; in five years, half of the gasoline sold in the U. S. will switch to the new antiknock additive.

•

"Instant" color photos were demonstrated at Polaroid Corp.'s recent stockholder meeting in Waltham, Mass. But Polaroid President Edwin Land says it will be another year before the new film is marketed. The color process (*CW, April 19, '58, p. 63*) is said to give uncertain results, and Land says, "We do not regard this as the time to announce technical details about the new process or characteristics of the new film; for example, the precise speed of the film has not been selected finally, but it will be within a range appropriate for use in standard, existing Polaroid Land cameras."

•

A new electrophoretic separation method, applicable to solutions or suspensions, is reported by Alexander Kolin, biophysicist at the University of California Medical School, Los Angeles. Method involves use of electromagnetic forces in combination with an electrical field to make charged atoms or molecules follow divergent (spiral) paths. Planned: separation of normal and cancer cells, hitherto not possible *in vitro*, using the new method. Kolin's research has been supported by the Office of Naval Research and the American Cancer Society.

Technology

Newsletter

(Continued)

First plant using Strategic-Udy steelmaking process (*CW, Dec. 26, '59, p. 34*) may be in this country rather than Canada. Sovereign Resources, Inc. (New York) has announced that its recently organized subsidiary, Sovereign Steel of Texas, will use the S-U process in a plant for turning out more than 1,000 tons/day of finished steel near Palestine, Tex. Quebec South Shore Steel Corp. is also planning an S-U plant for Canada, but Texas weather could help even up construction timetables for the two plants.

Reason for Sovereign's choice of the S-U process: the plant will "produce high-quality steel ingots and billets from iron ore and other East Texas minerals." East Texas iron ore is not good enough to use in conventional blast furnaces (unless it's mixed with higher grade ores). The S-U process is also able to use local lignite, not conventionally used in steelmaking.

•

First commercial electron-beam vaporizer for vacuum deposition of refractory metal has been developed by The Alloyd Corp. (Cambridge, Mass.). Designed for use in laboratory or commercial vacuum equipment operating at 3×10^{-4} mm. of mercury or lower, it handles all metals including such high-melting refractory types as tungsten, tantalum, columbium and molybdenum, which can't be vaporized by conventional induction or resistance heating. Expected uses: production of thin-film metallic coatings for microminiaturized electronic circuitry, optical filter films, other metallic coatings on various substrate materials.

•

Another ion-exchange fuel cell is in the news this week. Shortly after General Electric's disclosure of advanced work on an ion-membrane cell (*see p. 72*) comes word from Ionics, Inc. (Cambridge, Mass.), that it is now piloting an ionic cell capable of operating on hydrogen and unpurified air.

Ionics' disclosure indicates that negotiations over patent rights may be shaping up. Reason: Ionics has broad coverage on the composition and uses of ion-exchange materials in the 72 claims of its basic patent (U.S. 2,636,851), including the specific application of ion-exchange membranes in cells used to generate an electromotive force (claim 65).

The current-generating reaction in Ionics' fuel cell takes place in an electrolyte composed of bromine, hydrobromic acid and a nitrogen oxide catalyst. Hydrogen is fed through a porous distributor coated with a thin layer of platinum catalyst. Ionization of the hydrogen produces electrons, which flow out to an external load through a patented Tirelloy electrode, and hydrogen ions which pass through the membrane and into the electrolyte. Bromine is reduced to bromide ions at the Tirelloy electrode, is reoxidized to bromine by reaction with oxygen entering through a porous distributor plate at the other side of the cell. The cell operates at room temperature, develops an open-circuit voltage of 0.95-1.0 volts (about 80%-plus of theoretical efficiency).

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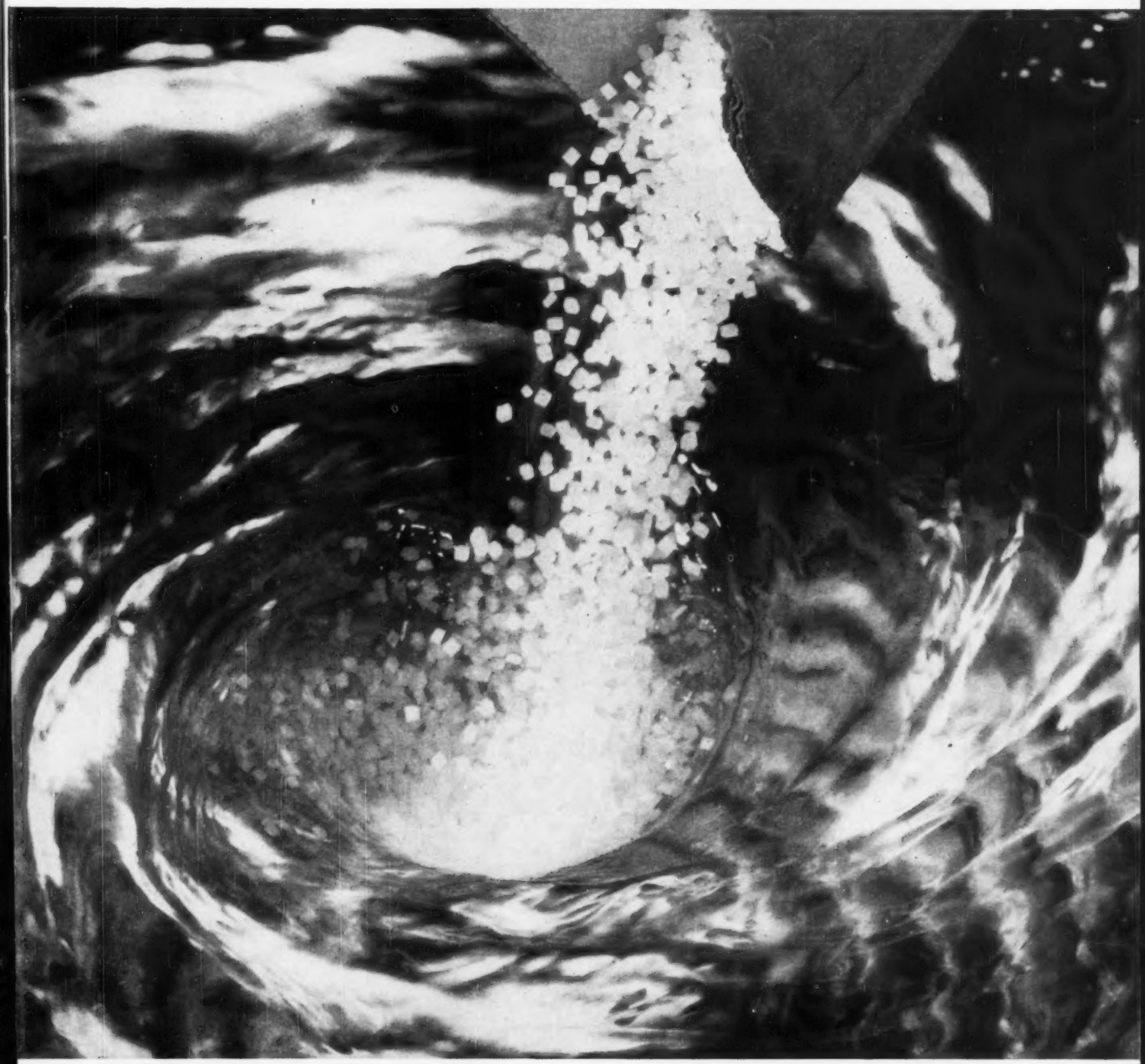

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Examples: A-C Polyethylene is already being used to improve textile finishes . . . coatings for corrugated and paperboard containers...waxes and polishes . . . washable plastic paints. The paper industry is looking into it as a way to build greater wet strength into towels, tissues, and butcher paper.

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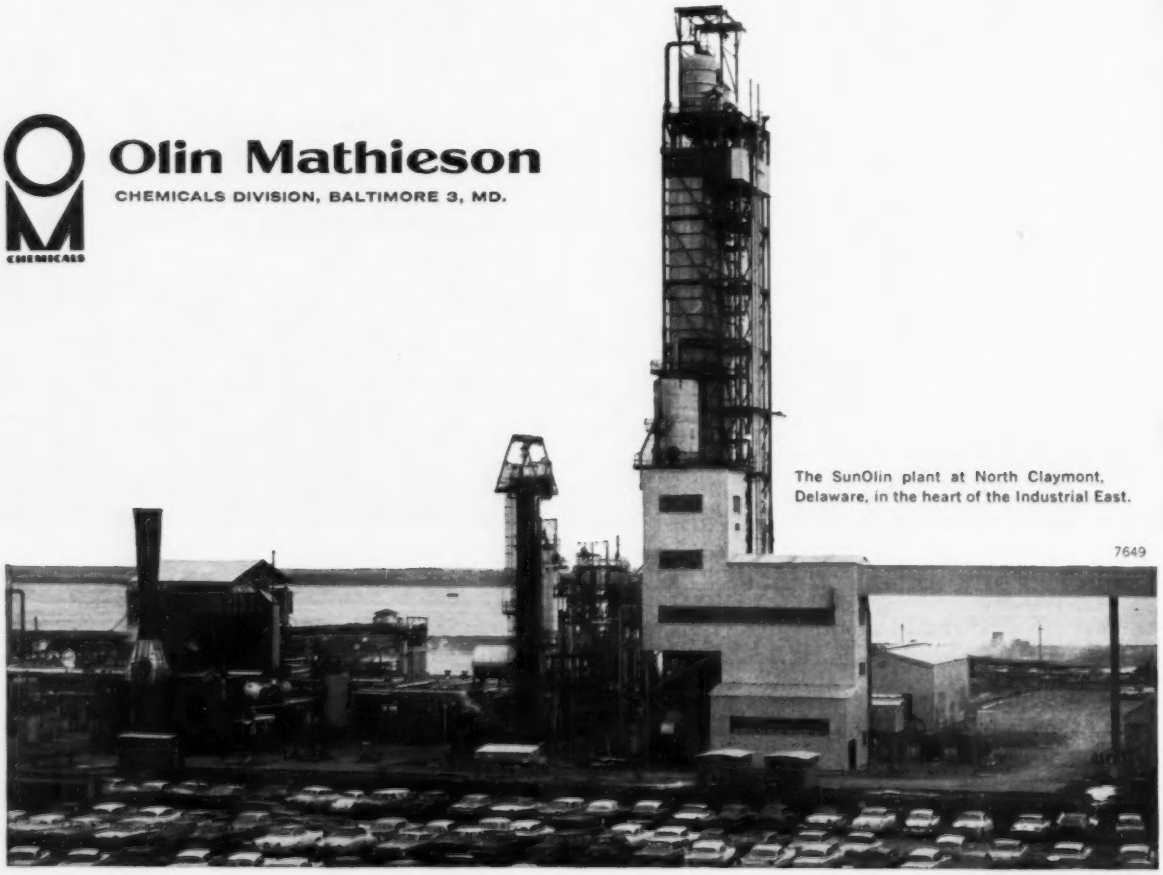
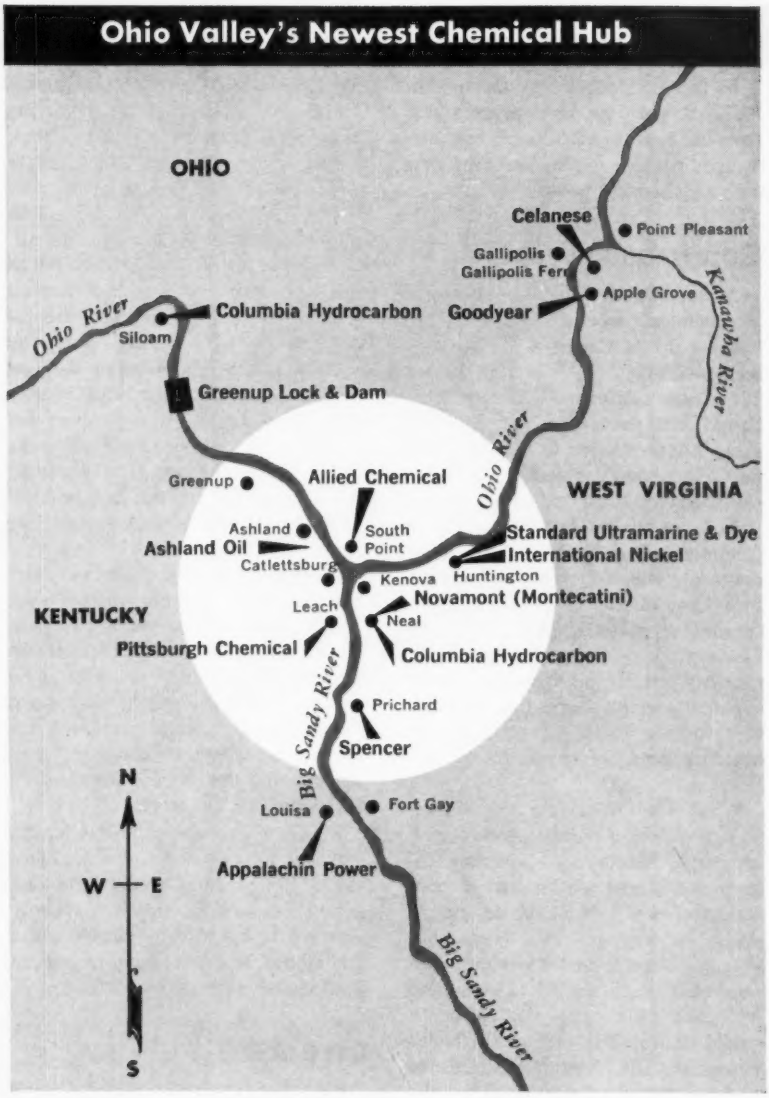


The SunOlin plant at North Claymont, Delaware, in the heart of the Industrial East.

7649



New Life on the Big Sandy

A lusty new petrochemical center is springing to life in the tri-state industrial hub where Kentucky, Ohio and West Virginia meet at the junction of the Big Sandy and Ohio rivers. If it keeps growing, the Big Sandy region may one day reach the proportions of West Virginia's famed Kanawha Valley nearby.

Most recent company attracted to Big Sandy's banks is Ashland Oil Co., which last week said it would put up a $5-million naphthalene-benzene unit on the Catlettsburg, Ky., site of its No. 1 and No. 2 refineries. The 15-million-gal./year benzene and 75-million-lbs./year naphthalene combination will bring Ashland's total investment at Catlettsburg to about $39 million.

Ashland decided to build in Kentucky—it had originally planned the unit for Buffalo, N.Y.—after it obtained contracts with five naphthalene users who will buy 60 million lbs. of the material, some 80% of Ashland's prospective capacity. Construction of the new plant is expected to begin next winter with startup scheduled for March '61.

Earlier this month, Pittsburgh Chemical Co. (subsidiary of Pittsburgh Coke & Chemical) pinpointed a site, adjacent to Ashland's Leach, Ky., plant, on which it will build a $4-5-million activated carbon plant. Also earlier this month, Appalachin Power Co., a subsidiary of American Gas & Electric Corp., revealed that it will build a $39-million coal generating plant at Fallsburg, Ky., two miles north of Louisa, Ky., on the Big Sandy. The new plant will consume 750,000 tons of coal annually, will produce 250,000 kilowatts, and can be expanded.

Still another industrial addition to the area will be made by Armco Steel Corp., which is expected to disclose soon a reported $100-million expansion of its steelmaking facilities in the Ashland-Catlettsburg area.

Increasing Interest: This accelerated interest in the region is related to two things. One, of course, is the presence of Ashland Oil's twin refineries with a total capacity of 80,000 bbls./day, capable of supplying petrochemical raw materials in quantity. Ashland has been busy the last three or four years installing equipment to diversify its petroleum products for sale to over-the-fence consumers and others.

But the major attraction for the chemical and other industrial developments is the $61-million Greenup, Ky., dam and locks being constructed under supervision of the U.S. Corps of Engineers and scheduled to go into service in '61. Located on the Ohio, about 38 miles downstream from Huntington, it will eliminate three old wicket-type dam and lock installations now between Greenup and upstream Gallipolis, where a modern roller-type lock is already in operation.

Aside from facilitating river traffic between the two points, the Greenup Dam will raise the pool level of the Ohio and Big Sandy. It will provide a new, 9-ft.-deep, 150-ft.-wide channel for 12 miles up the previously unnavigable Big Sandy, opening up the area for the industrial newcomers.

Others Are There: A number of other companies are already setting

up shop in the area. Novamont Co., newly formed American subsidiary of Italy's giant Montecatini Co., is constructing a $10-million polypropylene film and resin plant at Neal, W. Va., recently purchased additional acreage at the site for future expansion. Also at Neal, Columbia Hydrocarbon, subsidiary of Columbia Gas System, has an $8-million extraction plant under construction. Products are slated for its Siloam, Ky., fractionating plant, recently completed at a cost of $5-million.

A prospective builder in the same area is Spencer Chemical Co., which last year took options on plant sites 10 miles upstream on the Kentucky shore of the Big Sandy. Spencer planned to make caprolactam there, but deferred construction because of market conditions. Spencer last week told CHEMICAL WEEK it still has no plans for the site, although it has completed purchase of the land.

Nearby Plants: Nearby, in the Ohio River segment of the booming area, Allied Chemical Corp. has two plants at South Point, O., 10 miles east of Ironton. They are facilities of the Semet-Solvay and Nitrogen divisions. And in metropolitan Huntington, Standard Ultramarine and Dye Corp. and International Nickel Corp. each have plants employing 500 or more workers.

Upstream toward Point Pleasant, W. Va., two process companies' plants have started operations within the past year. They are Celanese Corp., at Gallipolis Ferry, W. Va., across the river from Gallipolis, O., and Goodyear Tire and Rubber Co. at Apple Grove, W. Va. When Goodyear's $10-million film and resin plant went onstream last year, the company hailed it as a "cornerstone" for a Goodyear chemical center in future years.

Outlook: The Big Sandy-Ohio rivers area will continue to attract petrochemical and other industrial plants. Events in recent weeks alone substantiate that forecast. Says one local businessman, "In the last few weeks, chemical company representatives have been jockeying for plant sites in the central Ohio Valley like gold prospectors of old." The Huntington Chamber of Commerce adds that within the past six weeks four different chemical companies—none with plants in the area—have inspected sites along the two rivers; a spokesman for the West Virginia Industrial and Publicity Commission adds that queries on plant sites have lately been mounting.

In fact it appears now that within the next year the tri-state area will have at least a half-dozen new site owners, perhaps even a spanking new crop of chemical plants.

Congress Scorecard

A number of bills of significance to chemical process industries are hanging fire in Congress. Preadjournment outlook:

• *Color additives* — The Senate-passed bill permitting the Food & Drug Administration to set tolerances for color additives, as it now does for food additives, will soon be reported out of the House Commerce Committee. It will pass the House, undoubtedly with a Delaney amendment forbidding tolerances for any cancer-causing agents. Efforts of the anti-Delaney forces to provide more scientific discretion in individual cases apparently aren't succeeding. The bill may include some sort of advisory board or board of appeal from FDA decisions.

• *Labeling.* Work on the bill requiring warning labels on toxic or flammable substances, providing information about conditions of use, antidotes, and the like, is nearly ready for passage. The Senate has already passed it and the House has completed hearings. Yet to be settled is whether food, drugs and cosmetics should be included, or handled under a separate law. Sentiment seems to be for separate treatment.

• *Water pollution.* Congress has appropriated $45 million, the same amount as in previous years, for continued construction of sewage treatment works. The House failed to override a Presidential veto of a bill that would have doubled annual federal grants.

• *Tax benefits.* As packaged in the so-called Boggs bill, H.R. 5, tax benefits for overseas investors would be limited to companies doing business in underdeveloped areas. Proponents brought it up for vote once, then withdrew it to draft limiting amendments. Chances are fair for House or Senate approval.

• *Grossing of foreign earnings.* A bill designed to encourage U.S. investors to leave their profits overseas ran into a storm of industry protest at House hearings recently, virtually killing any chance of passage. Industry witnesses said it would put foreign subsidiaries in the position of having to pay U.S. taxes on the part of their foreign dividends used to pay taxes to foreign governments.

• *Medical care for the aged.* This subject is still very much up in the air. Democratic leadership last week promised to support a modified Forand bill providing hospitalization benefits only, to be paid for by increasing Social Security taxes—taxing the first $6,000 of income, instead of $4,800. Republican liberals are plugging for a plan to help low-income old folks buy private insurance. The President is noncommittal on this hot political issue but would probably veto the compulsory plan.

• *Social Security.* Congress will pass at least one bill to liberalize Social Security in several ways: removing the present age requirement of 50 for receiving disability payments, covering doctors and some widows now left out, increasing benefits for dependent children, and possibly raising the earnings limit from $1,200 to $1,500 a year.

• *School construction.* Chances look good for passage of a bill providing $975 million over a three-year period for construction of schools. The Senate has already passed it and the House will act soon. Again, a Presidential veto appears likely.

LABOR

Split Votes: At the Linde Co. division of Union Carbide electrical welding equipment plant in Essington, Pa., clerical employees voted to be unionized, while two other clerical units turned down union representation by Local 1318, United Auto Workers. The election was considered significant because it was one of the first attempts to organize white-collar workers in the chemical process industries on the East Coast. In the plant clerical unit, five employees voted to be represented by UAW, which represents production and maintenance workers. But in the technical and office groups, clerical employees turned back UAW by votes of 7-2 and 22-17, respectively.

Emery digs in to expand Pelargonic, Azelaic Acid supplies

Emery's recently announced expansion of ozone oxidation facilities will increase several fold total production capacity of pelargonic and azelaic acids.

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ADMINISTRATION

At Niagara Falls, N.Y., Carbide's Metals Co. and Local 15-250, Oil, Chemical & Atomic Workers Union, have agreed on a new, two-year contract calling for a 7¢/hour across-the-board wage increase and a wage-reopener at the end of the first year. Also provided are wage adjustments in some job classifications.

•

New Elections: The National Labor Relations Board has ordered a new election to be conducted among 1,126 Dow Chemical Co. hourly paid employees at the Atomic Energy Commission plant at Rocky Flats, Colorado. The Denver Metal Trades Council, AFL-CIO, which has represented the employees for several years, beat out District 50, United Mine Workers, last month with 580 votes for Metal Trades, 491 for UMW, 25 for no union. UMW appealed to NLRB for a revote, charging that the Metal Trades Council reproduced a sample election ballot and distributed copies among the employees.

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Pay Hike: Employees of The Acheson Dispersed Pigments Co. plant at Orange, Tex., represented by OCAW, have accepted a 10¢/hour across-the-board wage increase.

•

Allied Settlement: Some 350 employees in four unions at Allied Chemical's National Aniline Division (Hopewell, Va.) plant have accepted a new, one-year contract that calls for a general 4% wage increase. Other provisions: improvements in accident, health and life insurance plans and fringe benefits. Unions involved are Local 10, Machinists' union; Local 10, Steamfitters and Plumbers; Local 666, Brotherhood of Electrical Workers; and Local 591, ICWU.

•

Canada Ruling: The Ontario, Can., Labor Relations Board has ruled that a union seeking a transfer of bargaining rights must have the consent of the union holding the rights. The ruling, in effect, rejects an application by Local 1025, recently chartered by the International Union of Mine, Mill and Smelter Workers, to gain bargaining rights for 2,200 employees of Falconbridge Nickel Mines, Ltd., at Sudbury, from a maverick brother local of the union.

•

Powder Pact: Members of Local 261, International Chemical Workers Union, and Hercules Powder Co. management operating the Navy Bureau of Weapons' Allegany Ballistics Laboratory at Cresaptown, Md., have agreed on a new, two-year contract calling for a 4% wage increase. Hourly wage hikes will range from 7½¢ to 12½¢, average about 11¢ for the 700 employees. A wage-reopener clause calls for new wage negotiations at the end of the first year. Other provisions: higher shift differentials, two and one-half times regular pay for holiday work.

LEGAL

Pollution Appeal: Hearings have been postponed on American Viscose Co.'s appeal at Front Royal, Va., from a decision that held the firm responsible for killing a half-million fish by polluting the Shenandoah River. The Virginia state water control board—which charged that the company's plant there was causing pollution of the river's south fork, and assessed it for damages of $152,000—said it needed more time before a court hearing. Viscose, in denying responsibility for the fish kill, appealed the board finding to the Warren County circuit court.

•

Delayed Action: A Denver district court jury has awarded $175,681 damages—highest ever awarded in Colorado in negligence cases—to the widow of a power lineman killed when a 36-ft. pole broke while he was replacing a transformer. The jury agreed with arguments that the lineman was killed because the pole had been improperly treated with preservatives six years before. It had been in place that long. The damages were assessed against Broderick Wood Products Co. and Commercial Testing Laboratories, both of Denver.

•

Antitrust Suit: The Commonwealth of Massachusetts has filed a triple damage antitrust suit against the Bituminous Concrete Assn., Inc., and 17 companies that make and sell bituminous concrete, road tar, and asphalt. The suit, filed in federal court at Boston, charges the association and the firms with conspiracy to fix prices and to submit "fictitious bids" to cities and towns in the state.

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New Price, Product Forms, Applications!

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New applications — New product forms have sparked many new applications. Pellets, for example, make sodium borohydride ideal for continuous fixed-bed, in-stream carbonyl group and peroxide reductions. SWS will perform the same reductions using simple contact methods. Sodium borohydride is exceptionally effective for foaming plastics and silicates; bleaching and stabilizing wood pulps; and treating natural and synthetic textiles. In any form, it offers many advantages as a high-yield reducing agent for esters, aldehydes, ketones, and peroxides.

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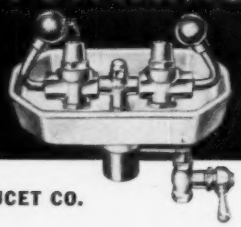

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ADMINISTRATION

KEY CHANGES

Bruce K. Brown to board chairman and chief executive officer, and **Frank M. Perry** to president, Petroleum Chemicals Inc., subsidiary of Cities Service Co. and Continental Oil Co. (Bartlesville, Okla.).

Thomas P. Nantz to vice-president, marketing, and **Robert D. Scott** to vice-president, manufacturing and development, B. F. Goodrich Chemical Co., division of B. F. Goodrich Co. (Akron, O.).

Robert E. Swisher to vice-president, marketing, Alsynite Division, Reichhold Chemicals, Inc. (San Diego, Calif.).

Frederick H. Shillito and **Orville T. Thompson** to board of directors; **George L. Innes** to vice-president, sales; **Kenneth E. Walker** to comptroller; and **Robert M. Hutchison,** to assistant secretary and assistant treasurer, Michigan Chemical Corp. (St. Louis, Mich.).

James L. Allen to board of directors, **Charles S. Brown** to vice-president, production, **Peter J. Marschall** to vice-president, engineering, Abbott Laboratories (North Chicago, Ill.).

I. Willard Crull to board of directors, Allied Laboratories, Inc., (Indianapolis).

William L. Davidson to chairman and chief executive officer, Trans-Sil Corp., partly owned subsidiary of Food Machinery and Chemical Corp. (Englewood, N. J.).

Eldridge J. Black to vice-president and general manager, Industrial Chemicals Division, Stepan Chemical Co. (Chicago).

John O. Logan and **C. L. Williamson** to vice-president and secretary, respectively, Penn-Olin Chemical Co., jointly owned subsidiary of Olin Mathieson Chemical Corp. and Pennsalt Chemicals Corp. (Baltimore).

DIED

Harold D. Tompkins, 66, vice-president, Firestone Tire & Rubber Co., at Boston, Mass.

Robert A. Burgoyne, 47, vice-president, Dunlop Tire & Rubber Corp., at Wigan, England.

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Market Newsletter

CHEMICAL WEEK
April 30, 1960

Canada is upping sales of aluminum ingots to Communist China. Aluminium Company of Canada has reportedly sold 5-6,000 tons of the metal to China this year; that compares with less than 3,000 tons shipped last year. China is paying full market price—23¼¢/lb.—charged by Canadian producers in foreign markets other than the U.S.

Current trade step-up with China marks another about-face in a series of on-and-off deals between the two countries. In the winter of '58-'59, for example, Alcan rebuffed China's business feelers because trade then might have antagonized bigger buyers in the U.S.

But in '59, as prices and international political atmosphere improved, Alcan began shipping to China. Later, that country was again dropped off Alcan's customer list, reportedly because Alcan was unwilling to grant the special terms it requested.

Alcan's renewed interest in the Chinese aluminum market may be at least partly prompted by fear that aluminum stocks may get out of hand. Reason: Alcan and U.S. aluminum producers are still pushing production, expect to top '59 output. Alcan's output, for example, might go as high as 700,000 tons, compared with 520,000 tons turned out in '59.

Although production schedules remain unchanged, the U.S. and Canadian aluminum industries are far less optimistic about consumption and sales than they were in first-of-year forecasts; business pickup has been less sprightly than expected, and consumption forecasts for the year as a whole are now being revised downward.

•

U.S. argon output climbed more than 18%, hit a record high in '59, to more than offset the recession-bred cutback in '58. Just-revealed estimate by the Business and Defense Services Administration puts '59 output at 440 million cu. ft., substantially more than the 372 million cu. ft. turned out in '58. Resumption of production growth underscores the expanding uses for argon which have made feasible a growing list of producing companies. In January '51 only three firms were separating argon (in four plants), now 19 companies operate 30 plants.

BDSA's latest ('58) end-use breakdown for argon (in % total consumption): welding 34.1%; aircraft, 33; electric lamp and electronics, 7.4; titanium, zirconium and other rare-mineral production, 5.3; automotive, 3.2; shipbuilding and railroading, 1.9; dealers and resale, 11.2; chemicals, nucleonics and miscellaneous outlets, 0.3; direct sales to government, 3.6%.

But a new look in the argon/helium production balance may be in the offing. For many years argon output has outpaced helium (*CW, April 25, '59, p. 86*), but the current big push for helium recovery (*CW Market Newsletter, March 19*) could put helium in the forefront.

Reichhold Chemical claims it has solved the wood rosin shortage problem that worries the papermaking industry (*CW, March 5, p. 73; April 16, p. 111*). Touting a new product called WETstrez p-685—used to waterproof starch-clay coating colors and adhesives—RCI says paper mills using the new product can reduce rosin consumption 40-50%.

•

Russia has picked up some more rubber on the London market. A purchase of 4,000 tons of natural rubber—in addition to 3,000 tons bought earlier (*CW Market Newsletter, April 16*)—brings total to 7,000 tons since March.

In this case, however, purchase was made through dealers, not through the British board of trade, although the rubber involved came from the government stockpile. The second transaction supports belief that Russia—and Communist China, which also is buying again—may this year materially influence international rubber prices.

•

Two developments in packaging films:

Scott Paper Co. (Chester, Pa.) continues its ambitious test-marketing program. Latest product is a polyethylene food wrap, Wonder Wrap, being test-marketed in two U.S. areas. According to Scott President Thomas McCabe, several similar products currently are being evaluated in foreign countries, including Britain. Scott sales are handled in the U.K. by its affiliate, Bowater-Scott Corp., Ltd.

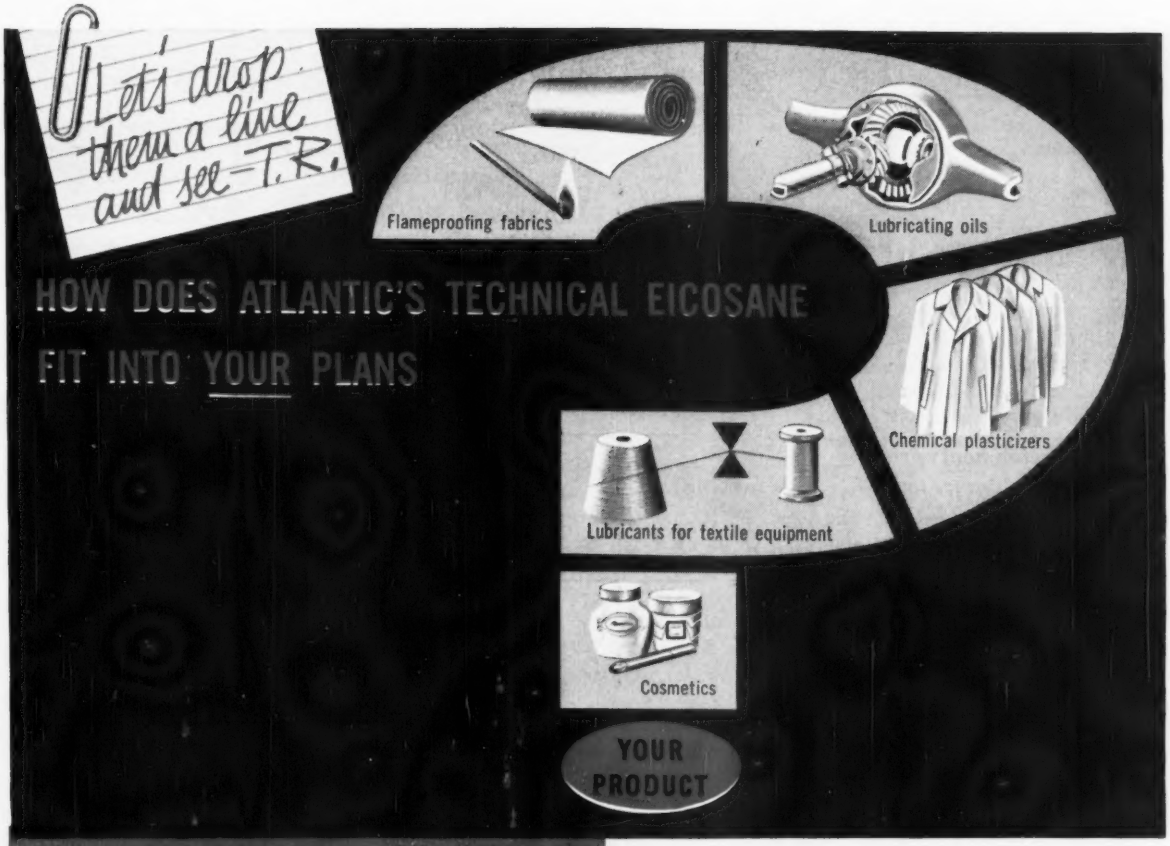
Meanwhile, says McCabe, Scott paper products are now being commercially marketed in Canada and Mexico. Canadian sales are doubling the 5% growth rate in the U.S., and Mexican sales are running twice '59 figures. McCabe warns, however, that in selling to foreign markets, it takes as many as five years to get a new product to the marketing stage, another two years for market development.

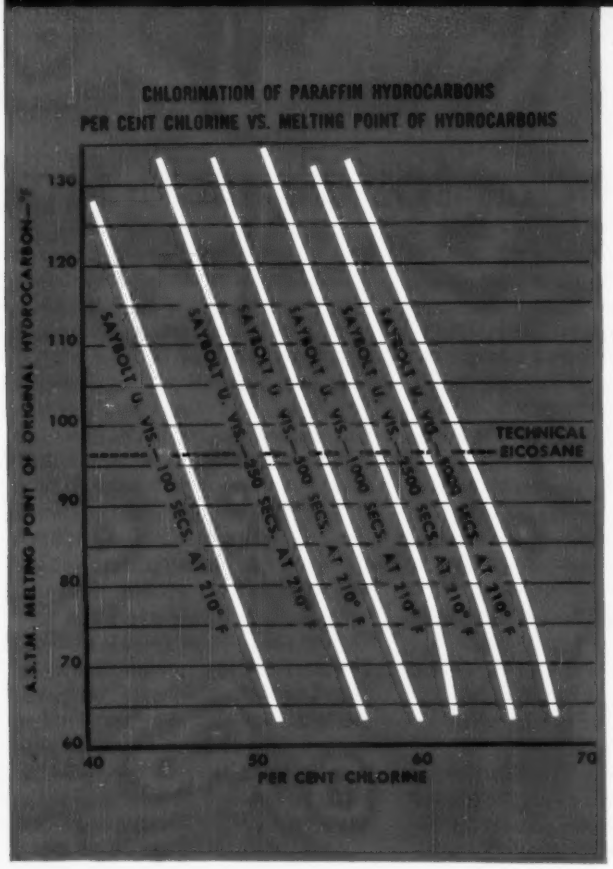
And, AviSun's polypropylene food-grade polymer and its film, Olefane, are qualified, under Food and Drug Administration's April 16 regulation, for use in all food packaging, according to the company. Likely use for film: boilable pouches. Also on the horizon, but 18 months to two years away, is the use of water-soluble film pouches for foods. Currently Mono-Sol (Gary, Ind.) and Reynolds Metals Co. (Richmond, Va.) are producing commercial quantities of a suitable water-soluble film from Borden Chemical Co.'s polyvinyl alcohol resin, Lemoflex. Application for FDA approval of Lemoflex for food packaging is under study.

SELECTED PRICE CHANGES—WEEK ENDING APRIL 25, 1960

	Change	New Price
UP		
Castor oil, imp., No. 1, Brazilian	$0.0025	$0.18
DOWN		
Citrol, CP bots.	$0.15	$3.60
Coconut oil, acids, dist., tank	0.0225	0.2575

All prices per pound unless quantity is quoted.

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A.S.T.M. MELTING POINT OF ORIGINAL HYDROCARBON—°F
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SAYBOLT U. VIS.—500 SECS. AT 210° F
SAYBOLT U. VIS.—1000 SECS. AT 210° F
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SAYBOLT U. VIS.—5000 SECS. AT 210° F
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Technical Eicosane is a water white mixture of predominantly straight chain paraffin hydrocarbons averaging 20 carbon atoms per molecule. Typical properties are: Melting Point, 96.5° F; Color (Saybolt), 25; Specific Gravity, 0.750 @ 176° F; Boiling Range @ 10 mm., 10%—383° F, 90%—410° F.

It can be readily chlorinated to yield a product with outstanding stability characteristics. In addition to being more stable, chlorinated eicosane has a lower viscosity for a given percentage of chlorine than paraffin wax as shown on the chart at left.

Because Technical Eicosane chlorinates so readily, it is used to make excellent flameproofing compounds for fabrics and for extending the life, mileage and effectiveness of heavy-duty gear lubricants. It is also used as an excellent raw material in manufacturing chemical plasticizers to help plastics resist freeze-up and the effects of hot sun, salt water and oil, and as a textile lubricant and cosmetic base.

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In Europe: Atlantic Chemicals SAB, Antwerp, Belgium
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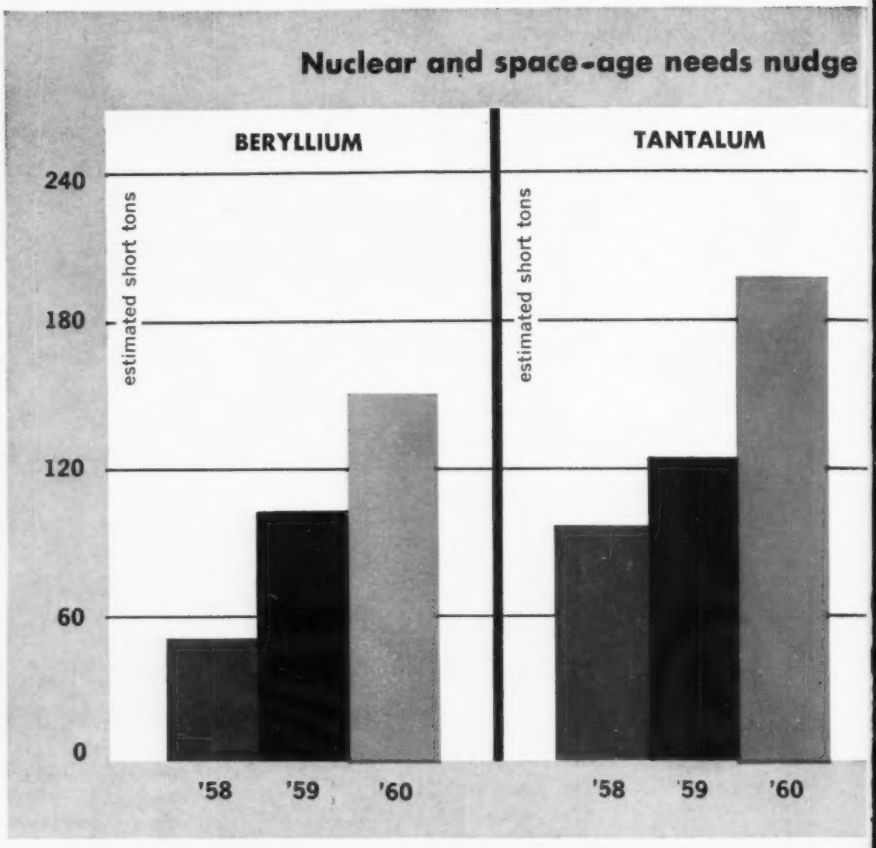


Sales development problems of beryllium, tantalum and columbium—three rare metals—typify the difficulties of cracking potentially lush space-age markets with novel materials. Here's how these metals have fared so far in atomic energy, missile, aviation, and other fast-paced and technologically evolving industries, and an estimate of their future.

Rare Metals Groom for Space-Age

Plans to expand beryllium metal capacity—recently revealed by Brush Beryllium (Cleveland) — underscores growing enthusiasm for a small group of minor metals that are today carving niches in atomic and space-age markets. Although growth is hampered by many tough problems, there's considerable optimism about the future of these metals—especially beryllium, columbium and tantalum.

Brush spokesmen say the firm had a "vacuum-cast beryllium" metal capacity of 8,000 lbs./month (96,000 lbs./year) in '58; it was upped to 12,000 lbs./month (144,000 lbs./year) in '59. And the Elmore, O., plant will eventually be boosted to 25,000-lbs./month (300,000 lbs./year) capacity.

In fact, a bit more can be squeezed out, and production has been pushed at full capacity. For example, Brush's output in '58 was close to 100,000 lbs.; this year, output of 200,000 lbs. is likely. (Brush thinks it can turn out 13,000 lbs./month now, expects more when new capacity becomes effective the latter part of '60. The full, 25,000-lbs./month capacity probably won't be operable until mid-'61.)

How Much Beryllium? A puzzler is just how the other U.S. producer — Beryllium Corp.—fits into the picture. That firm is somewhat more reticent about disclosing its production/capacity picture, despite Brush's revelations.

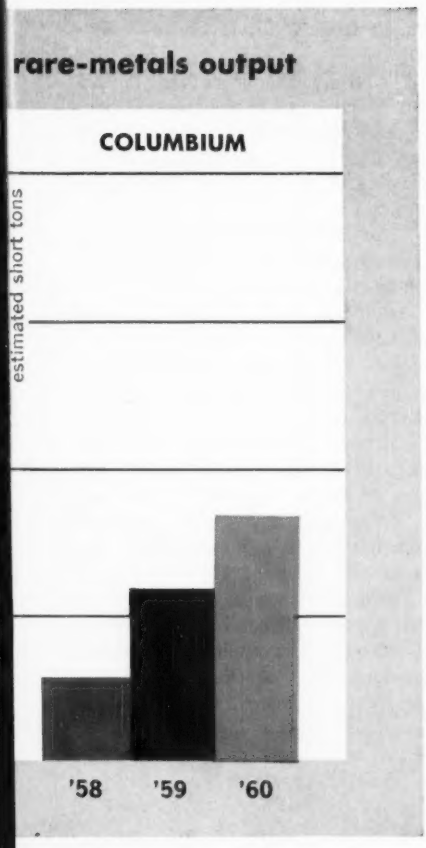
One explanation: Brush was seeking public financing of its beryllium venture, had to reveal its plans; but Beryllium Corp. isn't looking for outside money, prefers not to reveal its competitive potential.

Beryllium Corp.'s President Walter Lowry has, nevertheless, expressed faith in the "explosive growth" of the beryllium business, recently said his firm would spend about $3.5 million for expansion this year—mostly for new fabricating facilities.

Beryllium Corp. didn't turn out pure metal until the end of '58—was, in fact, about a year late in deliveries contracted with the Atomic Energy Commission. Significant amounts were, however, made in '59; more will come in '60.

Trade reports put Beryllium Corp.'s current metal output at some 100,000 lbs./year; but some observers warn that this is a tricky evaluation because the firm plans a fast take-off as soon as fabricating bugs are worked out. Implication is that the firm has much more theoretical capacity of prime metal than is used now; belief is that the firm doesn't want to step up production until it's ready to handle the metal in its fabricating plants, which will be steadily increasing through '60.

According to reliable estimates,



Role

Beryllium Corp.'s total output of prime metal should hit 300,000 lbs./-year by the end of '60 (which would probably be the output rate for '61).

Thus, the total current U.S. production of some 300,000 lbs./year seems reasonable; and there's a good possibility that output will jump to 500,000 lbs./year in '61. It would be a substantial increase over the outputs of recent years—200,000 lbs. in '59, 100,000 lbs. in '58.

The growth rate of beryllium in the years ahead—especially beyond '61—is still pretty much a guess because of several factors. The metal's ultimate importance in atomic, missile and other fast-changing uses is yet to be determined, although prospects right now are bright.

But there are still some tough fabricating obstacles. Hurdling them would do much to put beryllium markets into a fast pace.

Beryllium is used to make X-ray windows, is used in nuclear reactors (as moderator and reflector). There are also many—and some potential—uses for beryllium in aviation and missile applications (e.g., structural airframe parts, gyroscope parts, heat-sink applications). Particularly important industrial uses now are in the form of alloys—beryllium-copper, beryllium-nickel, beryllium-aluminum—which go into a host of fabricated parts (although alloy manufacture does not require intermediate preparation of pure beryllium metal, and these uses are not necessarily reflected in statistics on output of pure metal).

Beryllium Importer: Beryllium's bright future is generating mounting interest among minerals importers. Most recent importer, and the only one with mining interests: Standard Beryllium Corp., which is headquartered in New York.

The past two years, this firm has been privately owned and operated under the name Brand Overseas Corp. But it has now sold 200,000 shares of common stock to the public. Major customer for the beryl ore it imports. Beryllium Corp.

Standard Beryllium declares it may establish a subsidiary to lease equipment for further development of beryllium ore reserves in Brazil, which supplied about 30% of U.S. beryl imports in '59. Standard Beryllium has a 25% interest in Icombra—a Brazilian company that owns concession rights in three mines in the Fazenda Boa Vista area, and one in the Fazenda Larajeiras area.

Columbium/Tantalum Jog: One look at the current columbium and tantalum markets picture comes from Charles d'A. Hunt of Stauffer-Temescal (Richmond, Calif.), who recently discussed the metals at a meeting of the Western Market Research Group, in San Francisco. (Stauffer-Temescal produces ultrapure metals in electron-beam melting furnaces, also makes and sells ebm. furnaces to others.)

Hunt figures that the U.S. columbium business will add up to some 200,000 lbs. of production this year. He sees this as a $10-million/year business, considering that ingots sell for about $50/lb. (roundels are quoted at $36/lb., following a price drop from $50 several months ago).

Outlook for columbium—as Hunt sees it—is for an output increase of 10-20 tons/day and a price drop to about $8/lb. in the next five to eight years.

Hunt sees similar performances by tantalum, which has about double the market as columbium—i.e., about 400,000 lbs. this year. At the going price of $50/lb., this adds up to a $20-million/year business.

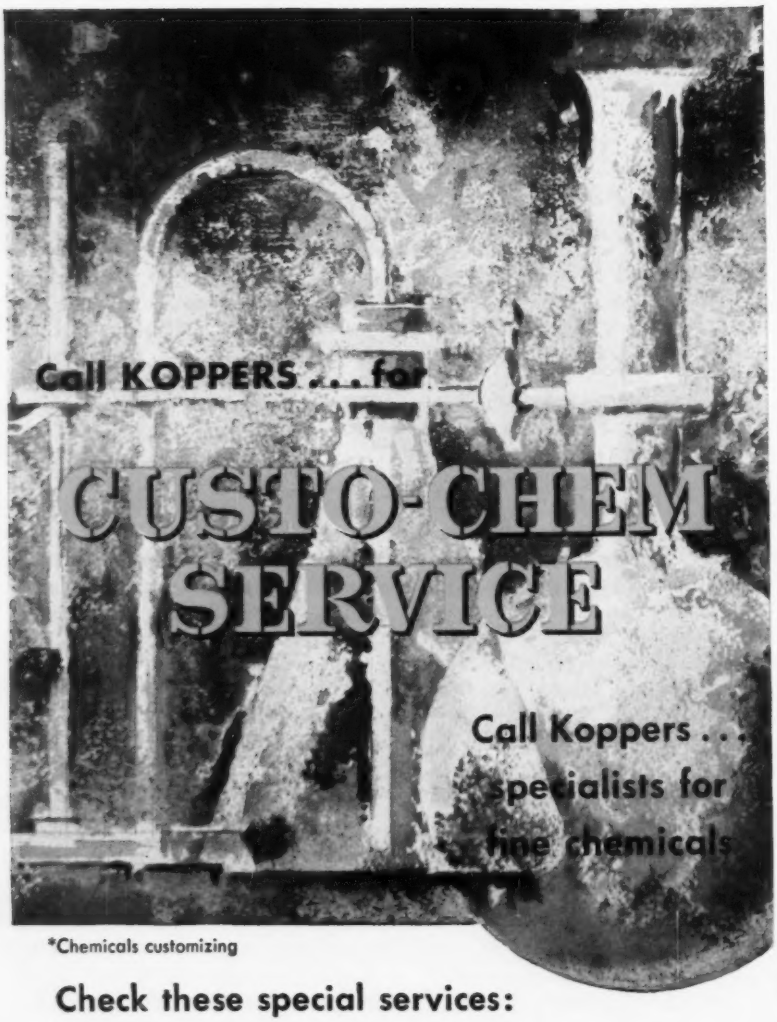
Tantalum prices have been dropping in recent weeks. Fansteel Metallurgical, for example, posted 25% price cuts, which pulled powdered tantalum down to $30/lb.; tabs on tantalum oxide and tantalum carbide were also reduced. Kennametal simultaneously reduced prices of capacitor-grade tantalum powders 14-23%, bringing 100-lb. lots down to $41.50/-lb. from $61.53/lb. Latest quotes on sheet tantalum are $50.35-59.18/lb.; for rod, $73.04-80.23/lb.

Fansteel based its price cuts on increased production at Muskogee, Okla., and expanded facilities at North Chicago.

As with columbium, says Hunt, tantalum markets won't really accelerate until substantial price reductions come about; then the metal can begin to compete effectively with more common metals. Moreover, developing major applications for these metals—especially in the CPI—is a long-term proposition. One reason: columbium metal and its alloys have good properties for various process applications, but engineers, according to Hunt, won't go out on a limb to try them. Nevertheless, there's hope that technological information gained by the atomic energy industry, and by rocket and missile engineers, will seep through into the chemical industry and spur increased interest in the metals.

Use of columbium-bearing alloys in high-temperature applications is increasing steadily; for example, the latest U.S. rocket plane (X-15) uses for its outer surface Inconel-X, which contains 1% columbium. Columbium and columbium-tantalum steels are used in fabrication applications where high strength is needed. Tantalum also is of growing importance in manufacture of capacitors (which feature high capacity per unit volume, low dissipation, long shelf-life).

Other Metals: Rumors earlier this



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MARKETS

month of impending shortages of tellurium metal brought emphatic denials from U.S. and Canadian producers.

(Tellurium producers are: American Metal Climax, American Smelting and Refining, International Smelting and Refining, Phelps Dodge Refining, U.S. Smelting, Refining & Mining.)

They estimate that annual output of tellurium in the Western Hemisphere can be increased to 500,000-750,000 lbs./year, using currently available sources. Heretofore, producers have made available only enough tellurium to serve existing markets.

Moreover, producers say, 1 million lbs. of tellurium could be refined from muds and residues accumulated by refineries; recovery of tellurium from nonferrous refining residues has up to now been of little interest.

There has been a relatively new and growing demand for tellurium in thermoelectric applications (direct transformation of thermal energy into electrical energy, or vice versa); important markets in thermoelectric devices used for electronic cooling and heating appear certain.

Heretofore, use of tellurium has been largely limited to metallurgical applications and in production of chemicals for rubber processing.

Tungsten is another minor metal now showing definite advances. One indication: a recent offering of commercial quantities of a new tungsten-tantalum alloy by Stauffer-Temescal (*CW, March 19, p. 66*).

As with other metals and their derivatives, tungsten prices have declined steadily. The metal is now quoted at $2.75-2.90/lb. in 1,000-lb. lots of 98.8% material.

In some instances the good fortunes of tungsten and tantalum may lie partly in their joint properties—as in case of the tungsten-tantalum alloy; but generally price is an important factor, as it is with all these metals (although some marketers think less so for beryllium than for tantalum and columbium). Nonetheless, market growth will hinge largely on the speed with which methods of making and handling the metals can be improved, and on accumulation of technical information that will pave the way for their use in nuclear and space-age industries.

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UNION CARBIDE

Dow's Midland maintenance supervisors meet each week to talk shop with manager Chase Oren. This

View from a Maintenance Manager's Chair:

Time is running out on Chase Oren's weekly maintenance supervisor meetings at Dow Chemical's Midland, Mich., plant (*shown above*). After 19 years of managing one of the largest chemical plant maintenance operations in the country, he retires this year. But from his vantage point, his final few meetings more than conclude long-working friendships. They also point up industry's main maintenance problem of the future: keeping in touch with the individuals who have to get the job done.

"Management in most chemical plants," says Oren, "is placing more and more emphasis on scientific methods and controls for improving maintenance performance. Many are already in use, and more are bound to come, because we're all working on them. The big danger is in losing sight of the human factors of the job."

Having weekly meetings is one way Oren has kept in direct touch with supervisors. "But there is a lot more that should be done about job motivation," he says. "We all have to get out into the plant and chat with the individual workers more often."

Charts show Oren (left) when there's smooth sailing or danger.

Oren, a large, bluff man, admits with typical candor that he doesn't get out into the plant often enough himself. And he quickly gets to the root of maintenance management's problem: "The job has grown too complex for one man to handle as I did until '48. Then, I got out into the plant often because each job was my worry. Now I have a staff of supervisors, and I only have time to worry about an individual job when it is a really big one. And then it is only for morale purposes."

A Friendly Pat: Oren has no fancy theories about motivation. "More than 95% of the men are honest and want to do a fair day's work. But each man needs a pat on the back every so often to show him that you still know what it is all about, even though you can't follow each job personally," he says.

Since there are over 1,600 in the Midland plant's maintenance force, the individual approach isn't easy. But Oren still manages to keep family names and personal news items for

is the way he sees them as he tries to solve his biggest problem: keeping in touch with the individual.

Look Longer at the Human Side of the Job

many of the workers properly sorted and tagged according to the individual concerned.

Compounding the problem is the large plant area over which maintenance work is spread. And in addition to central shops, the Midland plant, like many others, has been zoned, and area shops, supervision and crews have been set up (*CW, Aug. 9, '58, p. 57*). Oren solved the distance and decentralization problems of communication in '58, when the recession threatened to pinch maintenance jobs. He called the entire maintenance force together in the plant cafeteria for a meeting on economics, explained that the maintenance force would get some jobs that were ordinarily farmed out, if it could prove to management that it could do the jobs at lower cost than the outsiders.

Closer Together: While the human relations problem within maintenance departments may be growing, Oren says, another one that plagued many maintenance managers for years—the relations between maintenance and production — is well on the road to solution.

"Maintenance and production are moving closer together as processes increase in complexity. When plants were simpler, production could often run them until they fell apart. Today, little things can sometimes shut them down easily. And, in the last seven or eight years, production has learned that it must depend more on maintenance," says Oren.

But he doesn't hold with some maintenance managers who believe that maintenance men will some day run the plants (*CW, March 15, '58, p. 55*). They will always be servicemen, he claims, because you can't repair with one hand and operate with the other. "And, because it is a service group, maintenance is the first to have a finger pointed in its direction when there is trouble. It has to learn to expect that."

But there is less finger-pointing when plants use scientific maintenance controls, Oren says: "They wave red flags at you before you get into trouble."

For example, the maintenance de-

Paperwork worries Oren, keeps him from touring plant more often.

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PRODUCTION

partment at Midland uses plant motor loads as a gauge of its manpower utilization. Monthly IBM breakdown of work order information helps provide control over estimated and actual job costs, work backlog.

Oren points out that there was no real planning, scheduling and cost control when he took charge in '41, but he takes no credit for most of the "high-powered" techniques now being used. "All I did was pick the men. They worked out methods for analyzing and controlling what we used to do by the seat of our pants," he says.

Getting Good Men: Picking the right men for the job usually isn't easy, however. Like maintenance managers at many chemical plants, Oren has trouble finding men with the wide range of talents needed to fill supervisory jobs.

Maintenance supervisors must be able to handle men who are skilled craftsmen, must have an understanding of crafts as well as chemical processes—and in addition, have administrative ability. "A man must be a mechanical, civil, chemical and electrical engineer rolled into one. And a few business administration courses at college wouldn't hurt," Oren adds. "It's a tough field to interest youngsters in—maybe because i isn't stressed sufficiently at colleges," he says. Like many other maintenance managers, he sees the field as a major route to success. But he's puzzled by the inability of management to interest chemical engineers in maintenance careers.

Oren's assistant, Dick Woodbury, sees encouraging signs, however: "A few chemical engineering professors are stirring up interest in maintenance for thesis topics. What the college students haven't realized is that maintenance is practically a wide-open field for application of research talents."

But qualified men can often be found in unlikely spots. Oren's background, for example, is business administration. A number of others at Midland have come up through the construction ranks. In on-the-job maintenance training, Oren cites the job of coordinators as a key spot. They get job planning and scheduling experience, are immersed in communication with the mechanics and with the production department.

But all the on-the-job training and engineering and administrative background can't make up for lack in one area. "I've made only one big mistake in picking supervisors," Oren says. "He looked like a crackerjack, but I had to let him go because he couldn't get along with people."

Just how much maintenance efficiency can be improved by a friendly pat on the back may be difficult to gauge. But as scientific analysis of plant maintenance continues to take tighter hold, Oren's views are worth close scrutiny.

EQUIPMENT

Peak-Picking Recorder: Weston Instruments Division of Daystrom, Inc. (614 Frelinghuysen Ave., Newark 12, N. J.), is out with a new recorder that picks out peak points in measurement of process stream components. Called Model 6707, the recorder is particularly suited to studying trends in gas chromatography analysis of stream components.

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Transfer Control: Republic Flow Meters Co.'s (400 North Lexington Ave., Pittsburgh 8, Pa.) new line of pneumatic control stations features "bumpless" transfer between automatic and manual control. The stations are designed to operate with Republic's Vector Series of instruments, are accurate to 1% of full-scale readings.

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Pressure Transducer: A low-capacity pressure transducer for measuring differential, absolute and gauge pressures and translating them into an electrical output, is a new product of the Electronics & Instrumentation Division of Baldwin-Lima-Hamilton Corp. (42 Fourth Ave., Waltham 54, Mass.). The unit operates on line pressures up to 90 psi. Cell capacities: ±15, 30 and 60 psi.; accuracy: ±0.1% of full scale.

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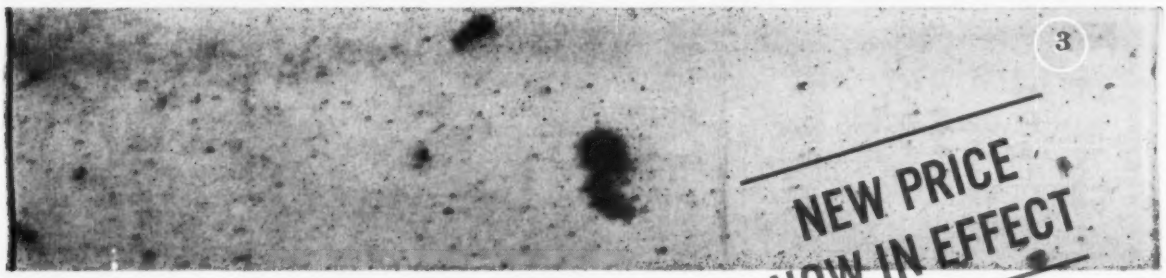

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Los Angeles 17 ..... Robert Yocom, 1125 West Sixth St., HUntley 2-5450

New York 36 ..... Charles W. Haines B. A. Johnson, J. E. B. Ladouceur, P. E. McPherson, Charles F. Onasch, L. Charles Todaro, 500 5th Ave., OXford 5-5959

Philadelphia 3 ..William B. Hannum, Jr., 6 Penn Center Plaza, LOcust 8-4330

Pittsburgh 22 ..... Duncan C. Stephens, Room 1111 Henry W. Oliver Bldg.,

San Francisco 4 ..... William C. Woolston, 68 Post St., DOuglas 2-4600

St. Louis 8 ..... R. J. Claussen, 3615 Olive St., Continental Bldg., JEfferson 5-4867

*For complete product data see catalog unit in the BUYERS' GUIDE ISSUE for 1959-60

premium in variable-speed sheave installations, T. B. Wood's Sons Co. (Chambersburg, Pa.) recommends its new sliding motor bases. The motor base is less than 2 in. high, slides to permit shortening center-to-center distance and freeing V-belts from the grooves for sheave adjustments.

•

High-Temperature Respirator: American Optical Co.'s (Southbridge, Mass.) new respirator cartridge for use at temperatures up to 300 F permits inspection and repair of furnaces, ovens and kilns prior to their cooling. Insurance company testing shows: increase in working time, without discomfort, from 7 minutes to 20 minutes in a kiln at 156 F and 20% humidity, and from a few seconds to 8 minutes in a wet kiln at 135 F and 80% humidity. The respirator has a heat exchanger of 65 layers of aluminum screening fitted into a semi-rigid polyurethane foam shell.

•

Long-Stem Thermometer: W. C. Dillon & Co. (14620 Keswick St., Van Nuys, Calif.) is offering a new stainless-steel, dial thermometer that has a 6-ft. stem for use in deep vats, tanks, ducts and stacks. Temperature ranges: 0-200 F and 200-1000 F; accuracy: 1% of full-scale reading.

•

High-Vacuum Gauge: F. J. Stokes Corp. (5500 Tabor Rd., Philadelphia 20) is offering a new series of ionization gauge controls for measurement of ultrahigh vacuum in plant applications. The controls, said to feature rugged construction and easy maintenance, have electrometer-type amplifiers rather than bridge circuits to negate feedback, improve accuracy. Models IG-50 and TIG-50 have a 10^{-3} to 10^{-9} mm. Hg range; models IG-60 and TIG-60, a 10^{-3} to 10^{-10} mm. Hg range. TIG models combine a thermocouple gauge circuit with the ionization gauge.

•

Welding Gun: High Vacuum Equipment Corp. (2 Churchill Rd., Hingham, Mass.) is offering a new electron-beam welding gun called Beamatron for welding uses such as for circumferential welds, applications where the part cannot be rotated as it's welded for annealing and heat-cleaning long sections of tubing. It's electrostatically focused.

Tracers

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Specialty equipment company requires manufacturers representative. Should be in the 35 to 45 age range and presently handling similar accounts. Several territories open. Submit resume to RW-4099, Chemical Week.

Agents Wanted—Sell our Laboratory controlled reprocessed by-product chemicals: Amines, Glycols, Solvents, Glycol Ethers, Polyethylene Waxes, GRS Latices. Our products sell up to 40% below current chemical market. Hot leads and active accounts turned over to sales producer. Aggressive representation especially needed in Eastern and Southern territories. Replies held in confidence. RW-4238, Chemical Week.

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Sleeper: Well established specialty chemical company in Northeast will return your investment within one year with adequate capital and marketing ability. BO-4254, Chemical Week.

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Send for Revised Illustrated Circular on our $3,000,000 chemical plant liquidation at Orange, Texas. All T316 SS equipment including tanks, columns, heat exchangers, filters, centrifugals, pumps, valves, pipe, etc. Perry Equipment Corp., 1415 N. Sixth Street, Philadelphia 22, Pa.

Dark Dioctyl Sebacate, Bulk, 32¢ lb. DBS Plast. Virgin Bulk 35¢ Barium Hydrox. N. F. (J. T. Baker Orig.) 15 Leverpaks $0.06/lb. Toluol 10,000 gals. $.20/gal. Isoprene-Enjay virgin 3 drums $.15. Ohio Apex KP23 Plasticizer. Orig. drums $.12/lb. Virgin Neopentyl Glycol-20-100# drums. Trimethylol Propane 20-100# drums. Barrett Pyridine 15A 3 orig. drums $.35/lb. Acetone 10,000 gals. $.45/gal. DDA Plast., Virgin, 20 drs 37¢/lb. FS-4167, Chem. Wk.

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Any quantity—55 gallon stainless steel drums in good used condition. Standard Barrel & Bag Co. 18640 Mt. Elliott Ave., Detroit 34, Mich.

Ammonia Superheater, 98 KW, with 36 heater elements. Also Whitlock Ammonia Steam preheaters, 50 sq. ft. Perry, 1415 N. 6th St., Phila. 22, Pa.

American 36" x 84" Vac. dbl drum dryer, ASME, excellent condition. Perry Equipment Corp. 1415 N. Sixth St., Phila. 22, Pa.

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Chemical Week

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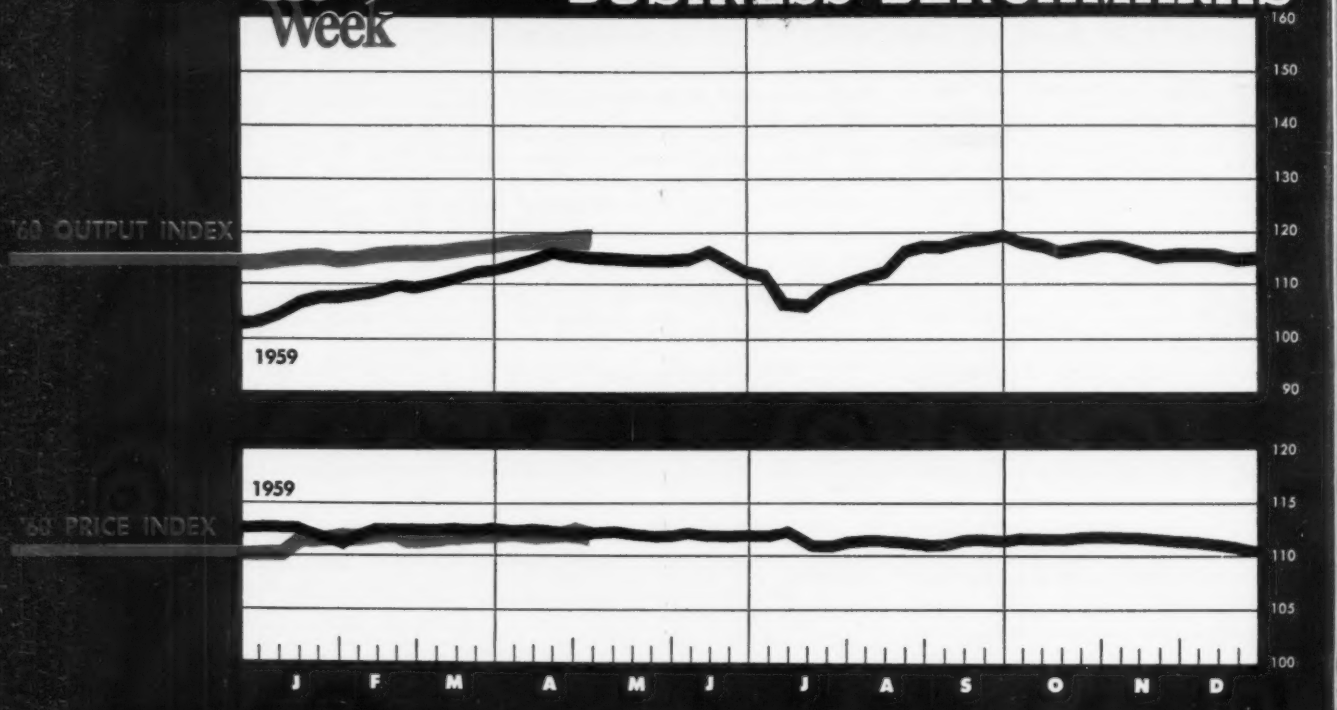


APRIL 30, 1960

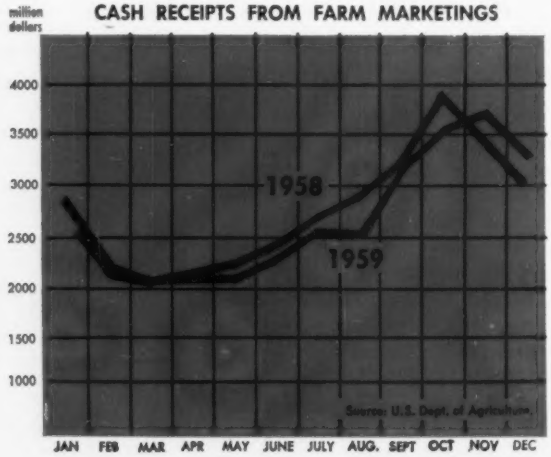
WEEKLY BUSINESS INDICATORS	*Latest Week*	*Preceding Week*	*Year Ago*
Chemical Week output index (1947-1949=100)	119.9	119.4	117
Chemical Week wholesale price index (1947=100)	109.9	110.8	112.2
Stock price index (12 firms, Standard & Poor's)	51.48	52.66	55.49
Steel ingot output (thousand tons)	2,305	2,225	2,646
Electric power (million kilowatt-hours)	13,263	13,494	12,609
Crude oil and condensate (daily av., thousand bbls.)	7,032	7,028	7,133

PRODUCTION INDICATORS 1957=100	*Latest Month*	*Preceding Month*	*Year Ago*
All manufacturing	111	112	106
Nondurable goods manufacturing	112	112	108
Durable goods manufacturing	111	112	104
Chemicals and allied products	121	119	112
Industrial chemicals	124	124	115
Petroleum and coal products	103	102	108

CHEMICAL CUSTOMERS CLOSE-UP

MANUFACTURERS' SALES OF PLASTICS

CASH RECEIPTS FROM FARM MARKETINGS



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- ☐ **Lithium Chromate**
- ☐ **Lithium Dichromate**
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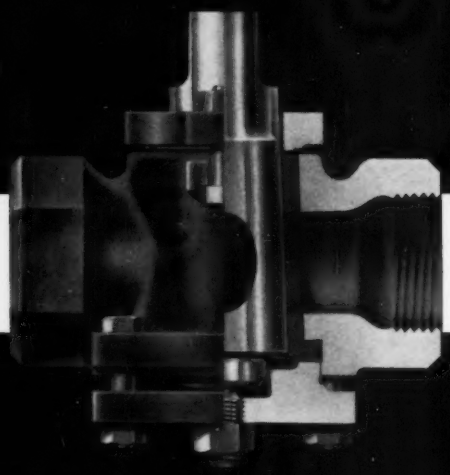

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